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AUTOMOTIVE INDUSTRIES

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U. S. Court Holds Labor Act Invalid

Bendix Granted Injunction Restraining N.L.R.B. from Holding Employee Election

The National Labor Relations Act was declared unconstitutional in its entirety by Judge John P. Barnes in the Chicago Federal District Court last Tuesday. The judgment was rendered in a suit brought Feb. 1 by the Bendix Products Corp. of South Bend, a subsidiary of the Bendix Aviation Corp., to restrain the Federal Labor Relations Board from interfering with the business of the corporation.

Judge Barnes stated that he would issue a preliminary injunction restraining the board from holding an election to determine whether the Union of United Automobile Workers of America, Local No. 9, or the Bendix Employees Association, a so-called "company" union, should bargain for the Bendix workers. Both unions contended that they represented a majority in the plant.

The board ordered the election last December, but agreed to postpone it until decision was made of the suit. The company contended that interstate commerce was affected only indirectly in the controversy and that the board therefore had no jurisdiction.

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Dealers Abandon NRA Provisions

Tire and Farm Equipment Industries Also Drop Them, Says Report to President

Of 2622 motor vehicle retail outlets, only 277 are reported to be wholly complying with the trade practices set down by the now extinct National Recovery Administration. The figures, released this week, are the result of a nation-wide survey conducted by President Roosevelt's committee appointed to investigate conditions subsequent to the repeal of the NRA.

Similarly in the rubber tire industry it was found that 61 establishments, out of a total of 107 investigated, are complying with all trade practices, and in the farm equipment industry, 327 of a total of 385 surveyed were wholly complying with the regulations.

Chief deviation from trade practices in the motor vehicle retail outlets came

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Hupp Planning Come-Back As Litigation Nears End

Final disposition of the long drawn-out litigation between Archie M. Andrews and the present Hupp Motor Car Corp. management is expected in the near future. Amended briefs in Andrews' appeal before the Circuit Court in Cincinnati on which hearings opened March 13 were filed on Tuesday this week and attorneys for the corporation said they would have their reply ready in three or four days. After that, the termination of the court proceedings will depend on the time required by the judges to make their decision. It is expected that prompt consideration will be given by the judges who are aware that resumption of operations at the plant await their decision.

The management has not given up hope of getting back into the current season's automobile market and has several plans under consideration for financing production as soon as the litigation is ended. Although the suspension of production since the first of the year has about wiped out field stocks, many of the corporation's important distributors are remaining loyal and a skeleton organization is still being maintained at the factory.

Retail Sales 70% Above Last Month

Greatly Increased Schedules Likely for April as Dealer Stocks Become Unbalanced

By HAROLD E. GRONSETH

Further sharp gains in retail sales of motor vehicles are disclosed by first returns from the field covering the second 10-day period of March and by the latest weekly reports. Representative companies show increases of 30 per cent to 40 per cent over the first 10 days of the month. In the face of widespread flood conditions affecting important markets, the expansion in demand is exceeding all expectations and presages a tremendous volume for the industry by the time the spring peak is reached.

Both factories and dealers underestimated the extent of the upswing this early in the season. Some companies expect to deliver more cars this month than they will build, drawing upon field stocks which are none too large to fill the immediate demand. Not a few dealers will go into April with inadequate or unbalanced stocks. Already some dealers have reached the point where they are unable to make prompt deliveries on certain models. The industry

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Bill Would Give Fund For Traffic Research

Proposed Study by Bureau Of Roads Would Promote Uniformity of Legislation

Favorable report has been made by the House Committee on Roads on a bill by Representative Cartwright, of Oklahoma, authorizing the Secretary of Agriculture to spend $75,000 from the administrative fund of the Bureau of Roads for study and research of highway traffic conditions. Originally, the bill authorized the expenditure of $150,000 for this purpose.

It provides for the study during the fiscal years ending June 30, 1936, and June 30, 1937, to be made in cooperation with Federal, State, District of Columbia and municipal authorities and other agencies. The Secretary would be required to make a preliminary report to Congress in nine months and to make a complete report not later than June 30 of next year,

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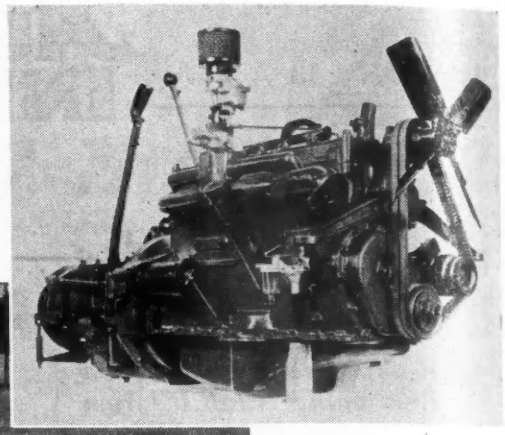
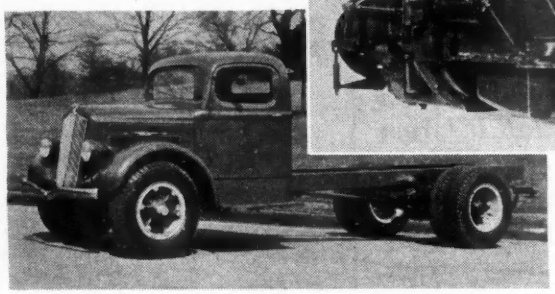
All Whites Streamlined

Modernization Extended to Entire Line; Three Models Added





White Model 720 3½ to 5 ton truck with modern styling. Six cylinder powerplant of White Model 718 truck

Last fall the White Co. announced modernized, streamlined versions of three of its lighter truck models, the styling being due to Count Alexis de Sakhnoffsky. In January two intermediate-sized models were similarly modernized, and now it is announced that the whole line of White trucks has been converted to the new style and also that three additional models in the 3½ to 6-ton range have been added to the line. Of the new models, Model 720, a 3½ to 5-ton truck, is listed at $4,175 for the standard chassis; Model 722, a 4 to 6-ton job, at $5,150, and Model 720T, which is designed specially for tractor service, at $4,175.

Wheelbases on both models range from 134 to 212 in. Both the 720 and the 722 are equipped with six-cylinder overhead-valve engines of the general design which has been used in White heavy-duty trucks for the past six years. Cylinder dimensions are 4 by 5½ and 4 5/16 by 5¼ in., and piston displacements 396 and 460 cu. in. respectively.

Wide-tread front axles are used, together with cam-and-lever steering. Both the 720 and 722 have the double-reduction rear axle with reduction by spiral bevel and herringbone gears. The axles are full floating and the axle shafts are fully ground. Load-carrying tubes are pressed into one-piece cast housings. The ranges of ratios for Model 720 is 7.22, 7.95, and 8.73, while that for Model 722 is 6.66, 7.74, 8.48, 9.5.

The standard tire equipment for the 720 is 9.00-20, with a maximum oversize of 10.50-22, and that for the 722, 9.75-20, with a maximum oversize of 11.25-22. Standard brakes on the 720 are of the White-Lockheed hydraulic type, operated by vacuum booster, with air brakes optional, while air brakes are standard equipment on the 722. Lining areas are 560 and 632 sq. in. respectively, ¾-in. molded lining being used. Emergency brakes are of the disk type, with four shoes.

Both models have alloy-steel frames, the side-rail section being 8½ by 3 1/16 by 5/16-in. on the 720 and 8½ by 3⅛ by ⅜-in. on the 722. Reenforcing plates are employed on chassis with wheelbases of 176 in. and longer.

New and more powerful engines are now used on the two models of intermediate capacity, the modernization of which by streamlining was announced last January. The engine on the 712 has cylinder dimensions of 3 25/32 by 4½ in., a displacement of 303 cu. in., and a maximum torque of 215 lb.-ft.; that on the 718 has cylinder dimensions of 3⅞ by 4½ in., a displacement of 318 cu. in., and a maximum torque of 230 lb.-ft. Both of these six-cylinder engines have seven-bearing, counterweighted crankshafts, and White patented combustion chambers which permit of the use of compression ratios of 5.5 with any standard gasoline.

A 12-in. clutch of the single-plate dry type, with automatic adjustment, is used. The 712 has a five-speed transmission with direct drive in fifth, and the 718 a five-speed transmission with direct-drive in fourth, the fifth speed being an overdrive. Three of the five speeds are through quiet helical gears. The front axles used on these models have treads of 61 and 70¼ in. These wide treads, together with cam-and-lever steering, assure easy handling. The rear axle on the 712 is of the single-reduction, full-floating type, with ground axle shafts and ratios of 5.11, 5.71, 6.43 and 7.17. On the 718 a double-reduction axle with the second reduction by herringbone gears is used; it is also of the full-floating type and has ground shafts. Both axles have pressed-in sleeves to carry the axle load. In the case of the double-reduction axle used in the 718, the ratios are 7.22, 7.95 and 8.73. The standard tire equipment of the 712 is 8.25-20, single front and dual rear, while that of the 715 is 9.00-20, single front and dual rear.

The brakes are of the White-Lockheed hydraulic type and assure automatic equalization. They have large, double-acting hydraulic cylinders, ⅜-in. molded lining and vacuum boosters. Air brakes are optional. Both models are furnished in wheelbases ranging from 130 to 226 in. Frames are heat-treated, the side rail section being 8 by 3 by ¼ in. Heavy reenforcing plates are used. The nominal tonnage rating is 3 to 4 tons for the 712 and 2 to 4½ tons for the 718.

Earnings Statements of Automotive Companies

	1935	1934
Vehicle Manufacturers		
Packard Motor Car Co.	$3,315,622	$7,290,549*
Studebaker Corp.	1,975,622*§	1,461,985*
Aviation Companies		
Boeing Airplane Co.	333,799*	225,977†*
Curtis-Wright Corp.	2,886	359,736
Waco Aircraft Co.	4,522	66,966*
Other Automotive Companies		
Atlas Imperial Diesel Engine Co.	36,885	30,411*
Bendix Aviation Corp.	3,163,921	1,903,120
Clark Equipment Co.	5,998	192,458
Doehler Die Casting Co.	623,818	460,551
Gabriel Co.	112,726*	140,759*
General Motors Acceptance Corp.	12,099,695	10,700,862
Kelsey-Hayes Wheel Co.	1,728,345	326,393
Motor Products Corp.	1,079,640	135,385
United American Bosch Corp.	250,130	50,101
Walker Mfg. Co.	102,151	162,475
Oil Companies		
Barnsdall Oil Co.	484,484*‡	1,029,446*
Ohio Oil Co.	5,488,267	5,411,924
Seaboard Oil Co. of Delaware	1,670,847	1,375,590
Shell Union Oil Corp.	6,812,835	1,353,901*
Standard Oil Co. of Kentucky	2,197,809	2,599,466
Standard Oil Co. of Ohio	2,690,647	1,913,735*
Superior Oil Corp.	244,624	274,019
Richfield Oil Co. of California	2,160,770*	1,681,292*

* Net loss. † Sept. 1 to Dec. 31. ‡ June 1 to Dec. 31. § March 9 to Dec. 31.

U. S. Output for Export Shows Gain; February Production Made Low Mark

Total vehicle production for the United States and Canada in February was down to 304,232 units, lower than any month since October. Severe weather conditions throughout the nation were heralded as a major cause for this decline. The figure compares with a total of 380,554 units in January and 353,781 in February a year ago.

The decline was consistent for both passenger cars and trucks in the United States and Canada with the exception of the U. S. production destined for foreign trade, which increased from 31,653 to 35,079 units. Truck production in Canada also showed a slight increase, rising from 2041 units to 2415 units.

A complete breakdown by type of vehicle and geographical distribution is given below.

Passenger Car and Truck Production—U. S. and Canada

	February, 1936	January, 1936	February, 1935	Two Months 1936	Two Months 1935
Passenger Cars—U. S. and Canada:					
Domestic Market—U. S.	204,681	280,968	257,044	485,649	467,850
Foreign Market—U. S.	21,771	18,958	18,579	40,729	37,006
Canada	10,853	11,261	13,885	22,114	22,154
Total	237,305	311,187	289,508	548,492	527,010
Trucks—U. S. and Canada:					
Domestic Market—U. S.	51,204	54,631	49,525	105,835	102,667
Foreign Market—U. S.	13,308	12,695	10,519	26,003	20,929
Canada	2,415	2,041	4,229	4,456	6,567
Total	66,927	69,367	64,273	136,294	130,163
Total—Domestic Market—U. S.	255,885	335,599	306,569	591,484	570,517
Total—Foreign Market—U. S.	35,079	31,653	29,098	66,732	57,935
Total—Canada	13,268	13,302	18,114	26,570	28,721
Total Cars and Trucks—U. S. and Canada	304,232	380,554	353,781	684,786	657,173

W-O Granted Right to Issue $750,000 More Certificates

No obstacles will be placed in the path of reorganization or immediate operations of the Willys-Overland Co., it was indicated in Federal Court here when Judge George P. Hahn granted an application to permit David R. Wilson, trustee, to issue up to $750,000 of trustee's certificates to finance the current production.

Approximately 1000 workmen are employed in the plant now and plans are to have finished cars off the production line about April 6.

The National City Bank of New York withdrew its objection to the financing of production when attorneys said arrangements had been made for full protection to bondholders. Appointment of Mr. Wilson as trustee was made permanent by the court.

Goodyear Deadlock Broken; Production Well Under Way

Production in most departments got under way March 25 in the Akron factories of the Goodyear Tire & Rubber Company which had been completely shut down since Feb. 17. The apparently hopeless deadlock between the Goodyear management and the United Rubberworkers Union was suddenly broken on Saturday, March 21, under pressure exerted by Secretary of Labor Frances Perkins, by an Akron Law and Order League of more than 40,000 Akron citizens, and by a vote of more than 12,500 Goodyear employees demanding that they be given the right to resume work.

At a union mass meeting held at the Akron Armory the company's terms were unanimously accepted by the Goodyear union. The proposal was little different from the one which the same union men had turned down just a week before.

It was expected that by the end of the week Goodyear factories will be operating close to capacity. It is unofficially estimated that the strike caused loss of at least $2,500,000 in wages to Goodyear employees and depleted the company's tire inventories by more than 1,000,000 casings.

Next Week

"Down the Assembly Lines at Plymouth"

with

JOSEPH GESCHELIN

Detroit Technical Editor
AUTOMOTIVE INDUSTRIES

A real contribution to the literature of automotive manufacturing—inaugurating a monthly series of articles on the modern plants of the automotive industry—in the first issue of each month

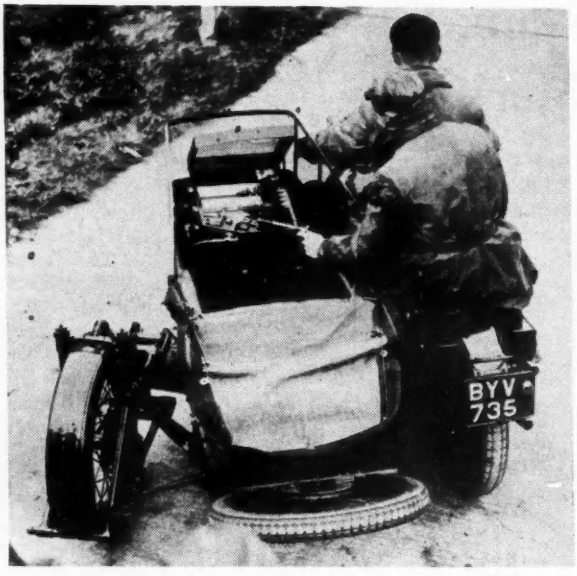
Watch for them!

AC Now Seals Plugs Hot By Automatic Machines

The problem of making spark plugs gas tight has been solved, according to AC engineers, by the company's new automatic machines, electrically operated, which seal the plugs while hot under pressure. A section of the steel shell is heated to a red glow causing it to collapse a predetermined amount, and permitting the shell and insulator to adjust themselves to each other while the metal is soft. The solid copper gaskets inside the shell mould themselves around the insulator and when the heat is shut off, shrinkage of the plug body makes the seal permanent.

For many years the one-piece spark plugs built by the AC Co. were "cold crimped." This method was later superseded by hot-crimping, and now this has been improved upon by the hot-sealing operation made possible by these specially built machines.

Automatic machines used to seal AC spark plugs under pressure while heated.



Globe photo

Specially equipped side-car used to test skid resistance of various road surfaces

GM Leads '35 Newspaper Ads; Hudson Is Largest Independent

General Motors Corp. led all automotive advertisers in newspaper lineage for 1935, according to an analysis of newspapers in 95 leading cities, conducted by Media Records, Inc., and published in *Editor & Publisher*. Of the corporation's total of 20,666,000 lines, by far the largest single item was the advertising of new Chevrolets, with 6,617,000 lines, followed by 3,157,000 lines for new Pontiacs, 2,315,000 lines for Buicks and 1,677,767 lines for Oldsmobiles.

Second largest advertiser was the Ford Motor Co. with 11,430,000 lines, of which 7,862,000 were devoted to new Ford cars. Following closely was the Chrysler Corp. with 11,216,000 lines. Plymouth accounted for 3,906,000 of this latter total; Dodge, 2,599,000 lines, Chrysler cars, 2,004,000 lines, and De Soto, 1,242,000 lines.

Largest advertiser among the independents was Hudson, with a total of 3,259,000 lines, followed by Nash with 2,385,000, Studebaker with 1,652,000 and Packard with 849,000.

Entirely new, or greatly increased, were the appropriations for used cars. Chevrolet devoted 1,073,000 lines for this purpose, followed closely by Ford with 1,034,000. Packard was only other entry in this field, with 2900 lines.

Ford truck advertising nearly doubled its nearest rival, having 1,642,000 lines, against Chevrolet's 910,000 lines, and Dodge's 669,000 lines. Largest of the independents was International with 472,000 lines, far surpassing the General Motors Truck total of 105,900.

In the tractor field, Caterpillar signed up for 36,800 lines, Allis-Chalmers for 13,500 and McCormick-Deering for 12,500.

The Sun Oil Co. led all others in its field with a total lineage of 2,499,000, followed by Socony-Vacuum Oil Co. with 2,451,000 lines and Standard Oil of Indiana with 1,827,000 lines.

By far the largest in the parts and accessory group was Fisher Body (included in the General Motors total) with 1,073,000 lines, while Champion Spark Plugs followed with 329,000 lines.

In the tire industry, Goodyear led Firestone by only 13,000 lines, totals for these companies aggregating 1,217,000 and 1,204,000 respectively. The B. F. Goodrich Co. followed with a total of 902,000 lines and the U. S. Rubber Co. accounted for 894,000 lines.

Skid Resistance

British Tests Show Varying Adherence on Different Surfaces

Results of tests on the resistance to skidding of motor vehicles on various kinds of road surfaces are shortly to be published by the Road Research Department of the Ministry of Transport, and in a paper read by Dr. R. E. Stradling, Director of Road Research, some examples of these results were given.

The tests were made with a motorcycle and sidecar apparatus designed by the National Physical Laboratory for measuring the relative slipperiness of roads, and extended over a period of four years. This machine has its side car wheel so arranged as to enable it to be set and held out of alignment, more or less, across the direction of travel; instruments in the sidecar indicate the force required to hold the wheel askew under running conditions. This sideways force divided by the load gives a "sideways-force coefficient," which can be taken as a relative measure of resistance to skids afforded by the road surface, the figure varying directly as the resistance to skidding.

As an example of the figures obtained with this machine, Doctor Stradling stated that under wet-weather conditions at 30 m.p.h. the sideways-force coefficient on an old and well used road with a surface of compressed rock asphalt was 0.1, whereas on a new rock asphalt surface, combined with pre-coated stone chippings, the coefficient under like conditions was 0.9. After four years, this last surface had a coefficient ranging from 0.65 to 0.8.

Another case quoted is that of a single-coat hot asphalt surface with pre-coated chippings; this had coefficients of 0.85 in winter when new and 0.75 after four years.

In view of the predominance of tarmacadam roads in Great Britain, a test of an old road of this kind with a freshly laid surface dressing with chippings is of prime interest to British road authorities; it was found after treatment to have a coefficient of 0.8. Cement concrete had efficiencies of 0.75 when new and 0.5 when old.

All the coefficients given were registered with the roads in a wet condition.

Retail Sales 70% Above Last Month

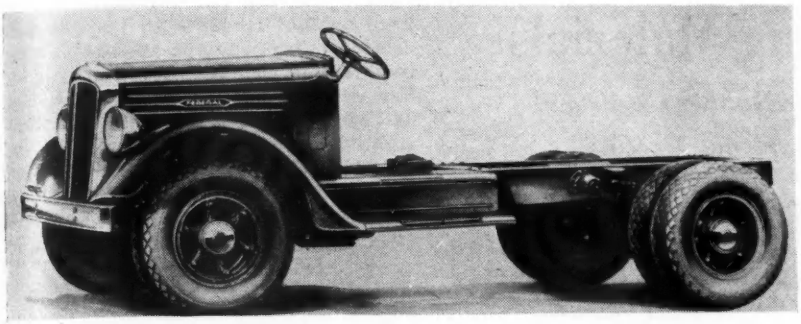
(Continued from page 455)

as a whole will do well to keep abreast of demand during the current month. Materially increased production schedules are in prospect for April.

If the current rate of increase in the retail market continues through the final reporting periods of March, the sales projection for the month will prove too conservative. First estimates were for 300,000 passenger cars and 53,000 trucks, representing increases of approximately 70 per cent and 20 per cent respectively over February deliveries. The relatively better showing of the former is due to the fact that passenger car sales, being more responsive to weather conditions, showed heavier shrinkage during the stormy month of February and, conversely, scored a sharper come-back when spring weather made its appearance.

Approximately 44,000 trucks were delivered at retail last month, a drop of only 3 per cent from January, whereas passenger car deliveries totaling roughly 178,000 units were off over 11 per cent. The above estimates for March, which are likely low, contemplate a 13 per cent increase in truck deliveries over March last year, while passenger car sales are figured about on a par with a year ago.

Undoubtedly a sizable slice of business was lost to the current month as



Federal 4 to 5-ton Model 40 chassis, one of three new heavy-duty trucks announced by the Federal Motor Truck Co.

Three New Federals

Wheelbases Reduced by Moving Engines, Cabs Forward

Three new heavy-duty truck models have been announced by Federal Motor Truck Co. of Detroit. Models 40 and 40DR have a nominal gross rating of 4 to 5 tons and a total allowable weight of 20,000 lb. Model 50 has a nominal rating of 5 to 6 tons and a total allowable weight of 24,000 lb. Prices for the standard 135-in. wheelbase chassis are as follows: Model 40, $2,590; Model 40DR, $2,715; Model 50, $3,195.

In these new models the engine, radiator, cowl and cab were moved forward, with the result that the distance from the face of the front bumper to the rear of the cab was reduced a foot and a half. With the same loading space as previously provided, the wheelbase can be reduced 18 in. and the overall length 16 in. This makes possible a new short wheelbase length of 135 in. The trucks are also being offered in wheelbase lengths of 145, 157, 167, 179, 192, 205 and 219 in.

The width of the front springs was increased from 2½ to 3 in. Timken front and rear axles are now used. Rear axles are of the full-floating, bevel-gear-drive type on Model 40, while Models 40DR and 50 have full-floating, double-reduction axles. Service brakes are Lockheed four-wheel hydraulics, applied by vacuum booster. Front brakes measure 16 by 2¼ in., rear brakes, 17½ by 4 in., except on the "50," where the rear brake linings are 5 in. wide. Tru-Stop emergency brakes are retained, and Dayton cast-steel wheels are now standard equipment.

Downdraft carburetion and a velocity-type governor are now powerplant features, the use of Waukesha engines being continued. The W. C. Lipe non-shock-loading clutch with vibration damper is used in all three models. The transmission is the Clark five-speed type with direct drive in fifth. Both the third and fourth speed gears are of the silent helical type. In the new 135-in. wheelbase chassis there is a single propeller shaft, while all longer chassis have two shafts with self-aligning center bearing.

As regards the styling of the new trucks, the shortened front end gives them a heavier appearance. Louvers have three chrome-plated moldings running across them. Radiator shells, headlights, and channel-type front bumper are chromium-plated. On Models 40 and 40DR all of the large hub caps are chromium-plated, while on the Model 50 only the front wheels have caps of this type. Skirted fenders are standard equipment.

A new cab (No. 66B) designed for these models is 66 in. wide, has a one-piece, insulated, stamped-steel roof, a V-type, safety-glass windshield with chromium-plated frame and dual wipers, plywood lining and insulated floor mat. The standard tire equipment of all three models is 9.00-20 ten-ply balloons, single front and dual rear.

a result of the floods. Obviously, people in the inundated areas or those threatened by floods are not in a mood to buy new cars nor to take deliveries of cars already ordered. Delivery figures now being reported probably would have been substantially higher were it not for these conditions.

Sales officials are of the opinion that the necessity for replacing flood damaged vehicles and the transportation requirements in connection with reconstruction work has built up a potential demand for cars and trucks from the flood belt greater than would have existed under normal conditions and which will come into the market in the near future. Dealers in these districts are expected to experience a booming service business.

Bill Would Give Fund For Traffic Research

(*Continued from page 455*)

with recommendations and suggestions for legislation for promoting necessary uniformity in motor vehicle traffic laws throughout the country.

The bill has been placed far down on the House calendar and will not be taken up soon unless it is done under a special rule. It has the support of Secretary of Agriculture H. A. Wallace.

In a report to Representative Cartwright, Secretary Wallace said, in part:

"An investigation such as that which the bill would authorize is very much needed. In fact, the appalling number of accidents on our highways and the resulting toll of deaths or injuries to persons and destruction of property makes it imperative that something be done to try to make traffic on our highways more safe. It concerns a problem which has been receiving the attention of the Bureau of Public Roads and of the states, municipalities, and other agencies, but such an investigation as that proposed should aid materially in arriving at the causes which underlie the hazards which confront traffic on our highways at this time. If the causes which are responsible for the serious record of accidents on our highways can be identified and exposed, it then should be possible to apply an effective remedy. The proposed investigation, therefore, would constitute a part of what necessarily must be the first step in trying to remedy the traffic situation on our highways, namely, to ascertain the causes which underlie the situation as it exists."

Burgess-Norton Co. to Pay Arrears on Preferred Stock

The board of directors of the Burgess-Norton Mfg. Co., of Geneva, Ill., voted, at a meeting held last week, to pay at once two years' accumulated dividends on the preferred stock of the company. This action was taken following the completion of a $50,000 modernization and new equipment program started last fall.

Burgess-Norton Mfg. Co. is one of the largest independent manufacturers of automotive parts, such as piston pins, clutch plates, starter drives, etc.

Dealers Abandon N R A Provisions

(*Continued from page 455*)

in the form of more-than-maximum trade-in allowances. Concerning the observances of maximum hour regulations, it was found that 1025 of the 2622 dealers were complying, while 1597 were not. Minimum wage regulations claimed more general adherence with 1642 complying and 980 not complying. Out of the entire 2622 outlets investigated, 801 complied with both minimum wage and maximum hour regulations.

In the rubber tire industry it was found that several companies departed in some respect from the trade practices specified such as price distinctions, price guarantees and the policy of selling seconds to others than employees. Concerning observation of maximum hour and minimum wage regulations, no figures are available.

Deviation from trade practices in the farm equipment industry are small, there being only 58 companies out of the total of 385 who did not observe all provisions.

Standards for Testing Materials

Committees Report on Lubricants, Rubber Goods and Electroplating at A.S.T.M. Regional Meeting

A symposium on high-strength constructional metals, comprising five papers, was held at the A.S.T.M. regional meeting recently held in Pittsburgh. Two sessions, morning and afternoon, were devoted to the papers and discussion. There was a particularly lively discussion at the afternoon session when the two papers on steel were presented. Following is a list of the papers presented at the meeting:

Alloys of Aluminum and Magnesium, E. H. Dix, Jr., chief metallurgist, and J. J. Bowman, metallurgical division, Aluminum Research Laboratories, Aluminum Co. of America.

Alloys of Copper, C. H. Davis, metallurgist, the American Brass Co.;

Alloys of Nickel, G. F. Geiger, research and development department, the International Nickel Co.;

Carbon and Low-Alloy Steels, E. F. Cone, editor, *Metals and Alloys;*

Corrosion -Resisting Steels, E. E. Thum, editor, *Metal Progress.*

Petroleum Products and Lubricants

A number of the subcommittees and technical committees of A.S.T.M. committee D-2 on petroleum products and lubricants met in Pittsburgh during A.S.T.M. committee week. Action was taken at the meeting to recommend the adoption as standard of the existing tentative method of test for viscosity by means of the Saybolt Viscosimeter (D 88 — 35 T) and it was decided to conduct further work to improve the accuracy of this method. Committee D-2 arranged to have published as information, the procedures for the determination of kinematic viscosity by means of suspended-level and modified Oswald types of instruments.

In 1935 there was published as information, a proposed method of test for oxidation number of lubricating oils by the Sligh method. This was based on the procedures used by a number of the cooperating laboratories which undertook tests to obtain data on the reproducibility obtainable with this oxidation test. The subcommittee in charge, at its Pittsburgh meeting, decided to continue development of the method and to conduct cooperative tests of the National Bureau of Standards in order to eliminate sources of error in the present method.

Technical committee A on gasoline was authorized to form a new subcommittee charged with the development of a method for the determination of the lead tetra-ethyl content of gasoline. The discussion of the development of gasoline specification was largely limited to sulfur specifications and the establishment of seasonal and geographical limits to be applied to the expression of vapor pressure specifications.

Symposium on Life of Rubber Goods Planned

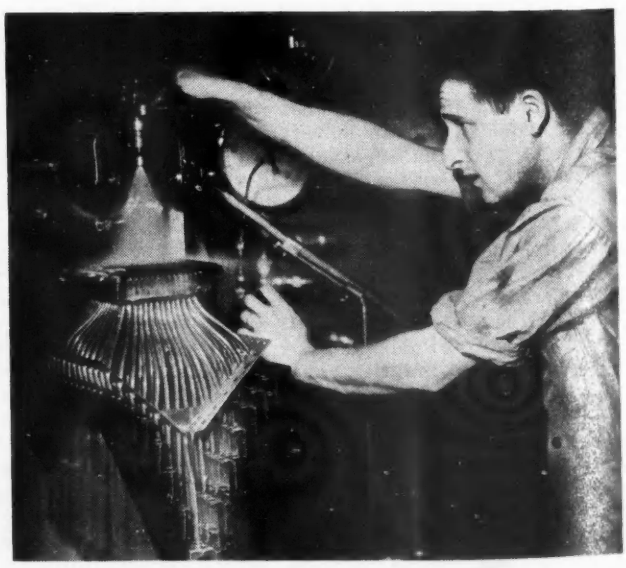
A.S.T.M. committee D-11 on rubber products at its meeting during committee week in Pittsburgh completed plans for a group of technical papers, to be presented at the Society's annual meeting in Atlantic City in June, which will comprise a symposium on the subject of "The Relations Between Laboratory Evaluation and Service Life of Rubber Products." The subject will be covered by five papers on different types of rubber products which will include tires, footwear, automotive parts, hose and belts, insulated wire and cable.

The specifications and test methods under the jurisdiction of the committee which were recently published in a special volume of "A.S.T.M. Standards on Rubber Products" were thoroughly reviewed and some changes were decided upon. In the "Standard Methods of Chemical Analysis of Rubber Products (D 297 — 32)" the short procedure is to be brought into conformity with the long test procedure and other revisions will affect the determinations of total sulfur and carbon as well as the analysis of hard rubber. In the "Tentative Methods of Tension Testing of Vulcanized Rubber (D 412 — 35 T)" instructions for calibration of testing machines will be included and, also, the number of required test specimens will be reduced in cases of inspection tests where minimum values have been established. Several revisions were approved in the "Tentative Methods of Test for Accelerated Aging of Vulcanized Rubber (D 428 — 35 T)." It was decided to amplify the present "Tentative Method of Test for Compression Set of Vulcanized Rubber (D 395 — 34 T)" which involves the use of constant load by adding an alternative method using constant distortion and also to provide for use of cylindrical instead of rectangular test specimens.

Joint Conference on Electroplating

At a meeting in Pittsburgh during the A.S.T.M. group committee meetings, the joint committees on electroplated coatings, sponsored jointly by the American Electro-Platers' Society, National Bureau of Standards and A.S.T.M., considered a number of comments that had been received on the three specifications covering electrodeposited coatings of zinc, cadmium, nickel and chromium on steel, which were published last year. Discussion at the meeting indicated that the salt spray test is not especially useful for testing zinc and cadmium coatings, but that a test to distinguish between good and poor coatings of the same thickness would be desirable. Purity of the coatings might also be specified. It was the sense of the meeting that while the present symbols in the specifications are satisfactory, consideration should be given also to a designation based on the specified thickness, for example, "zinc 50" would refer to a zinc coating with a minimum thickness of 50/100,000 in.

While thicker coatings than those specified in the requirements are occasionally required, the meeting felt that at present there was not sufficient demand for thicker coatings to justify action on this matter. Consideration of the present requirements calling for an average of 0.00002 in. of chromium, led to the conclusion that this is not excessive for the automotive industry. It is likely that the specifications will be continued as tentative standards for another year without change.



For checking spray dispersion from Hesselman or Diesel fuel-oil nozzles, the Waukesha Motor Co. has developed this instrument. The grid above which the nozzle is held communicates by copper tubing and delivers the oil from each sq. cm. into calibrated test tubes in the rack. From the volume caught in each numbered test tube, the spray dispersion can be plotted.

"No Fixed Payment Terms" Feature New GMAC Plan

The most economical way to purchase an automobile on instalments is to pay as much per month as possible and acquire ownership as soon as possible, according to John J. Schumann, Jr., president of General Motors Acceptance Corp., announcing a new form of plan with no fixed down payment.

"In presenting the new General Motors Instalment Plan (formerly called the GMAC Time Payment Plan) to the public, we have stressed the fact that the important question is not whether the payments are to be $15, $20, $25, or any other fixed amount per month, but whether they meet the circumstances and income of the individual purchaser," Mr. Schumann pointed out.

"The down payment should be as large as conveniently possible because this also helps to keep down the final cost to the instalment purchaser. And finally, the instalment purchaser should avoid any purchase plan which does not disclose, in a simple and understandable way, the exact costs of various payment terms, so that he may see for himself and select the most economical and practical plan which suits his individual requirements."

Great Lakes Exposition To Have Motor Exhibits

Contracts have been awarded for the $155,000 building that will house the automotive exhibits at the Great Lakes Exposition to be held in Cleveland from June 27 to Oct. 4. Plans call for two self-ventilating units, each 543 ft. long. An interior landscaped exhibition court and 70-ft. high pylons will be important features.

Among automotive advertisers who have already signed for space are the Ford Motor Co., Hercules Motors, Bendix Westinghouse Automotive Air Brake Co., and the Murray Ohio Mfg. Co.

Gilmore-Yosemite Economy Run Results Announced by A.A.A.

Final tabulation of the results of the Gilmore-Yosemite Stock Car Economy Run, held on Jan. 9, has been announced by the Contest Board of the American Automobile Association. The run was sponsored by the Gilmore Oil Co., Los Angeles, and was limited strictly to stock cars of present production.

Complete results of the run follow:

Held Jan. 9, 1936; length of course, 352 miles; sanction No. 3246, A.A.A. Contest Board.

Class	Make	Type	Weight	Pass. Carried	Total Gas Used	Total Oil Used	Total Water Used	Av. Ton Miles	Av. Ton Miles Per Gal.	Av. Miles Per Gal.
1-A	Willys 4	Sedan	2980	4	10.6	..	..	524.5	49.48	33.20
1-A	Willys 4	Sedan	2845	4	11.0	..	..	500.7	45.52	32.00
1-A	Willys 4	Sedan	2610	2	13.6	1	..	459.4	33.77	25.88
2-A	Chevrolet 6	Sedan	3225	2	13.7	..	..	567.6	41.43	25.69
2-A	Graham Crusader 6	Sedan	3760	5	13.9	..	..	661.8	47.61	25.32
2-A	Plymouth 6	Sedan	3845	5	15.7	..	..	676.7	43.10	22.42
3-A	Terraplane 6	Sedan	3790	4	14.7	..	..	667.0	45.37	23.94
3-A	Pontiac 6	Sedan	4000	3	14.7	..	..	704.0	47.89	23.94
4-A	Nash "400" 6	Sedan	4140	4	15.8	..	..	728.6	46.11	22.12
4-A	Oldsmobile 6	Sedan	3740	2	14.8	..	..	658.2	44.47	23.78
4-A	Pontiac 8	Sedan	4100	4	16.0	..	..	721.6	45.10	22.00
4-A	Studebaker Dictator 6	Sedan	4200	5	14.5	..	..	739.2	50.98	24.27
5-A	Auburn 6	Sedan	3900	2	14.9	..	..	686.4	46.07	23.62
5-A	Chrysler 6	Sedan	4450	5	16.8	..	..	783.2	46.62	20.95
5-A	De Soto Air Stream 6	Sedan	4155	4	15.2	..	..	731.2	48.11	23.15
5-A	Graham Supercharged 6	Sedan	4160	5	13.2	..	1	732.2	55.47	26.66
5-A	Hudson 8	Sedan	4060	4	15.4	..	..	714.6	46.40	22.85
5-A	Hupmobile 6	Sedan	4100	5	15.7	..	..	721.6	45.96	22.42
5-A	Nash Ambassador 6	Sedan	4665	4	18	..	..	821.0	45.61	19.55
5-A	Oldsmobile 8	Sedan	4000	2	18.2	..	..	704.0	38.68	19.34
5-A	Reo 6	Sedan	4180	4	23	..	..	735.7	31.99	15.30
6-A	Auburn 8	Sedan	4240	2	17.6	..	1	746.2	42.40	20.00
6-A	Chrysler 8	Sedan	4500	5	17.8	..	..	792.0	44.49	19.77
6-A	De Soto Airflow 6	Sedan	4470	4	16.3	..	..	786.7	48.26	21.59
6-A	Hupmobile 8	Sedan	4740	5	18.2	..	1	834.2	45.84	19.34
6-A	Nash Ambassador 8	Sedan	4800	4	19	..	..	844.8	44.46	18.52
6-A	Packard "120" 8	Sedan	4440	4	17.6	..	..	781.4	44.40	20.00
6-A	Studebaker President 8	Sedan	4780	5	17.3	..	..	841.3	48.63	20.34
7-A	Chrysler Airflow 8	Sedan	5820	5	19.2	..	..	1024.3	53.35	18.33
7-A	Lincoln "Zephyr" 12	Sedan	4400	4	19.9	..	1	774.4	38.91	17.68

Note: Gasoline recorded by gals.; water in pts.; oil in pts.

R. J. Fitness

R. J. Fitness Works Manager and Chief Engineer of Reo

Appointment of R. J. Fitness as works manager and chief engineer of the Reo Motor Car Co. has been announced following close on his recent return from Europe. While abroad Mr. Fitness worked with Reo's London branch in the development of an export program designed to take advantage of improved business conditions in the British Isles and on the Continent.

Purdue University Holds Conference on Diesels

A two-day conference on Diesel engines and transportation was held at Purdue University, Lafayette, Ind., on Thursday and Friday of this week, under the direction of the School of Mechanical Engineering and the Engineering Extension Department. Combined with the conference was an exhibition of Diesel engines and accessories. Papers were presented by John Hannon of International Harvester Co., H. M. Wiles of Waukesha Motor Co., O. D. Treiber of Hercules Motor Corp., C. H. Baxley of Sinclair Refining Co., L. C. Carlton of United American Bosch Corp., F. M. Young of Young Radiator Co., F. G. Gurley of the Burlington Lines and J. C. Hale of the Trans-American Freight Lines.

Bendix Planning Safety Meet For Automotive Service Men

Bendix Products Corp. is laying plans for a highway safety convention to be held at South Bend May 25-28. It is expected that more than 500 representatives of some 30,000 automotive service men in the United States will attend. Plans are being made by Frank B. Willis, vice-president in charge of sales.

Used as promotional "ambassadors" for the conference, 42 key men in the Bendix service department will visit every dealer handling Bendix products in the next eight weeks to stir up interest.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES

Trade was retarded last week by the floods in several sections of the country, and many lines of business are expected to be affected directly or indirectly for some time to come. However, despite the flood menace, both wholesale and retail trade showed improvement. After five consecutive weekly declines, the output of electricity increased. Because of the floods, the Association of American Railroads was unable to compile the data relating to railway freight loadings at the usual time; but it is known that there was a sharp decline.

Store Sales Rise

Sales of 27 store chains, including two mail order houses, during February were 7.3 per cent above those in the corresponding period last year. Sales of the 25 store chains alone were 7.9 per cent above those a year ago.

Construction Almost Double Year Ago

Construction contracts awarded in 37 eastern states during February, according to the F. W. Dodge Corp., were 90 per cent above the total of $75,047,100 reported for February, 1935. However, the total was 30 per cent below that in the preceding month, and this decline is attributed to the low temperatures and heavy snows during February.

Power Output Up 10 Per Cent

Production of electricity by the electric light and power industry in the United States during the week ended March 14 was 10 per cent above that in the corresponding period last year.

Food Costs Higher

Retail food costs during the two weeks ended Feb. 25, according to the Bureau of Labor Statistics, increased 0.9 per cent. A considerable part of the advance was due to a marked increase in the price of eggs and a continued rise in the price of butter. The current index is 81.3 per cent of the 1923-25 average.

Farm Prices Decline

According to a report of the Bureau of Agricultural Economics, the prices received by farmers have declined recently. Hog prices have decreased because of the seasonal increase in slaughter from the relatively large 1935 pig crop. Relatively large supplies of cattle during the next two months are also in prospect, and cattle price recovery is dependent on a strengthening in consumer demand.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended March 21 stood at 82.5, as against 82.4 the week before and 82.8 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended March 18 showed an increase of $1,000,000 in holdings of discounted bills. Bills bought in the open market and Government securities remained unchanged. Money in circulation increased $1,000,000, and monetary gold stocks rose $3,000,000.

U.S.S.R. Is Largest Buyer Of French '35 Air Exports

French aviation exports for 1935 totaled $9,949,500. The U.S.S.R. took the largest amount, valued at $1,727,154, while Belgium-Luxemburg was second with $1,303,698, and Italy third with shipments amounting to $1,026,234.

Five Air Lines Combine To Build a Super Plane

Anticipating that air travel two years away will be so vast that present equipment will no longer be sufficient, five of the major air lines are cooperating with the Douglas Aircraft Co. in the construction of a 40-passenger liner. Announcement of the joining of effort in the experimental work is made by Colonel E. S. Gorrell, president of the Air Transport Association of America.

It is expected that the experimental plane will be ready for tests in 1937 and that it can be put into service the following year. Cost of constructing the liner will be in the neighborhood of $500,000 while subsequent planes will cost from $200,000 to $250,000 each. The air companies that have united in the plan are American Airlines, Eastern Air Lines, Pan-American Airways, Transcontinental and Western Air Lines and United Air Lines.

Colonel Gorrell explains that the combination has been formed solely for the period of experimental work, and that it is expected to save nearly $2,000,000 for the participating companies. Each line will have the privilege of ordering any number of the planes that its requirements may demand.

Major specifications call for a low-wing monoplane resembling a greatly enlarged Douglas DC-2 and weighing 25 tons loaded. Top speed of 230 m.p.h. is expected with a cruising speed of 193 m.p.h., using 60 per cent of available power. A range of 900 miles will be possible with 40 passengers and 2000 miles with 20 passengers in sleeping compartments.

The plane will have a wing spread of 140 ft., an overall length of 95 ft. and a height of 20 ft. It will be equipped with four 1000 hp. engines and will have a landing speed of 65 m.p.h. Incorporated in it will be all latest features of design, construction and navigation aids.

Indestructible Wheel Co. Formed by Lebanon Group

Indestructible Wheel Co., Inc., of Lebanon, Ind., has been organized for the manufacture of metal products, wheels, automobile parts and commercial trailers. Incorporators of the new company are: A. M. Lofland, Will C. Davis, Harry L. Lenox, Harvey P. New and Roscoe Hollingsworth. Mr. Lofland will serve as president of the company, Mr. Lenox as vice-president and Mr. Davis as secretary-treasurer.

The company has acquired the Wheel Works plant of Lebanon, which has been operated for the past 26 years by Mr. Lofland. The new company is expected to offer a wider scope, both in manufacturing and servicing branches, than has been possible heretofore.

Annual A.T.A. Convention Will Be Held in Chicago

The 1936 convention of American Trucking Associations, Inc., will be held in Chicago, probably in October. Sessions will be held at the Stevens Hotel, where the two previous annual meetings have been held. Announcement to this effect has been made by Chester G. Moore, director of the Central Freight Association, who is chairman of the convention committee. The committee's action has been ratified by the A.T.A. headquarters in Washington.

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

The fate of the saddle horse can be read in the figures which were obtained for a number of fairly good stock at a recent sheriff's sale in New York. Eighty-nine of them went under the hammer at an average price of $30 apiece. Verily, the bicycle is having a decidedly bearish influence on the horse market. — From *The Horseless Age*, March, 1896.

The WORLD on WHEELS

1. The picturesque new Kingman, Ariz., and Las Vegas, N. M. highway winds down Black Canyon and crosses the Colorado River over Boulder Dam. A four-lane highway was built on the crest of the dam.

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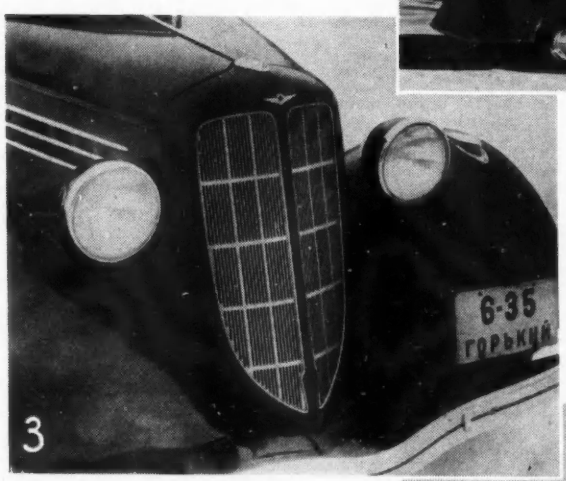
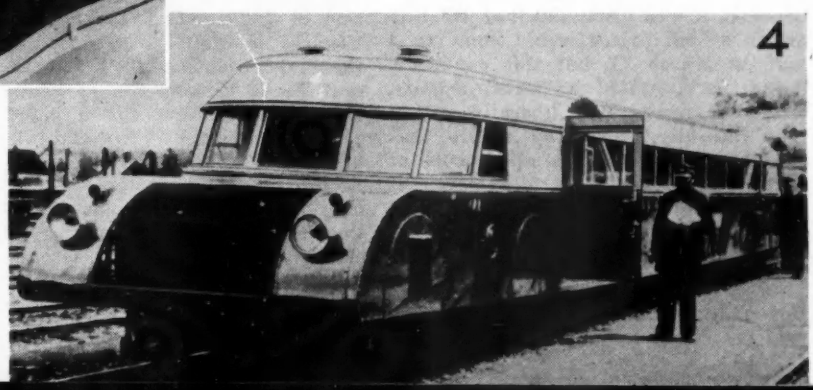
International, Sovfoto and Triangle photos.

2. This new-style trailer is not for sale—it is furnished to tourists who buy the special family tours offered by a Champaign, Ill., agency.



3. The new style Soviet car, Model MI, went into production on March 15. This is the first complete restyling of the car since the U.S.S.R. began making passenger vehicles.

4. Poland, too, has streamlined trains. The latest one to go into service is powered by a Diesel engine, has an automatic clutch, and a speed of 93 m.p.h. is claimed for it.



Medium Priced Cars Gained Most In First Two Months' Production

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

First two months 1936 and 1935 compared

	1936	1935	Per Cent Change	Per Cent of Total 1936	Per Cent of Total 1935
$500 and under	320,512	323,662	— 1.0	58.44	61.41
$501-$750	195,664	185,943	+ 5.2	35.67	35.28
$751-$1,000	23,589	9,307	+154.0	4.30	1.77
$1,001-$1,500	6,559	4,891	+ 34.2	1.20	.93
$1,501-$2,000	1,219	1,531	— 20.4	.22	.29
$2,001-$3,000	869	1,110	— 21.6	.16	.21
$3,001 and over	80	566	— 85.8	.01	.11
Total	548,492	527,010	+ 4.0	100.00	100.00

Truck Production by Capacities—First Two Months Compared

(U. S. and Canada)

	1936	1935	Per Cent Change	Per Cent of Total 1936	Per Cent of Total 1935
1½ tons and less	129,391	123,573	+ 4.8	94.94	94.94
2 to 3 tons	4,958	5,215	— 4.9	3.64	4.01
3½ tons and over	1,163	955	+ 21.9	.85	.73
Special and buses	782	420	+ 86.1	.57	.32
Total	136,294	130,163	+ 4.9	100.00	100.00

METALS..

Detroit Steel Mills Now Operating Near Capacity

The steel market's complexion underwent little change as the result of the gap in the output in flood-affected areas. Rolling and finishing mills suffered relatively little from the havoc wrought by the floods in the Pittsburgh district, which since the decentralization of the steel industry is credited with a production of 30 per cent of the country's ingot tonnage. While a certain amount of inter-company shifting of orders from units in need of cleaning up to those unaffected undoubtedly took place, there was no need of such transfers on the part of consumers.

Detroit district mills, operating at close to capacity, together with those in the Cleveland and Chicago areas, were speeding up output of flat steels for shipment to automobile plants and parts makers. This intensified activity, however, was in no wise connected with the interruption in production, caused elsewhere by the flood, but was based on a desire to work off as much as possible of their first quarter business, booked at lower prices than those now nominally in effect for second quarter orders. When the latter were announced, it was intimated that all shipments at old prices would come to a halt on March 31, but this condition, it was later stated in some quarters, would be interpreted liberally rather than literally, with the result that bona-fide orders now on mills' books at lower prices would be filled, even if mills could not ship them before April 1.

So far little is heard of second-quarter commitments at full prices, subject to quantity differentials. Demand for forging bars from parts makers has broadened. Anticipating heavier assemblies, specifications and shipping orders for bolts and nuts are also increasing.

Pig Iron—Damage to blast furnaces in the flood areas is reported to have been negligible. More and more second quarter business at prices unchanged from those prevailing is being placed, with automotive foundries being among the leading buyers.

Aluminum—The market for both primary and secondary metal rules firm and unchanged. Traffic interruptions have slowed down the movement of scrap to secondary refining plants, but on the other hand demand is being met to a considerable extent from consumers' reserve holdings.

Copper—The Connecticut Valley brass and copper fabricating industry appears to have escaped major flood damage. The dual price set-up in the copper market continues, with bookings so far in March around 25,000 tons.

Tin—London cabes indicate that negotiations for a renewal of the restriction of tin production are meeting with considerable difficulty, several of the producing countries, especially Siam, which is a large producer, having demanded enlarged quotas. Some of the producers are averse to continued curtailment of their output when the market, as it is, affords them fair profits. Spot Straits tin sold at the beginning of the week at 47⅞ cents, unchanged from the preceding week's close.

Lead—Steady and unchanged.

Zinc—Quiet and easy.

Tire Dealers Ask FTC For Product Grouping

George J. Burger, secretary and general manager of the National Association of Independent Tire Dealers, announced in New York March 24 that the association had filed with the Federal Trade Commission in Washington formal application for a commission complaint against 31 tire and tube manufacturers in the United States, under Section 5 of the Federal Trade Commission Act. The association's application, according to Burger, seeks to clarify the matter of first, second, third, fourth, and fifth line tires, to eliminate the confusion in the minds of motorists and to eliminate alleged deception and unfair advertising.

Last fall the dealer association started a move for a trade practice conference under auspices of the Federal Trade Commission for the purposes of developing a code of fair practices for tire manufacturers and marketers. Recently F.T.C. officials stated the response to their census of the industry indicated a desire to have such a conference held, and they indicated it would be held this spring, although as yet no date has been set.

Muskegon-Sparta Merger Effected by Stock Deal

Stockholders of Muskegon Piston Ring Co. and of the Sparta Foundry Co. have approved merger of the two concerns into a new $1,000,000 corporation to be known as the Muskegon Piston Ring Co. Consolidation will be effected by exchange of 1½ shares of Sparta Foundry stock for each share of Muskegon Piston Ring. The Sparta and Muskegon plants will be operated as separate divisions.

Officers of the new concern include: T. E. McFall, Muskegon, president; John E. Johnson, vice-president in charge of Muskegon Division; Harold C. Vaughan, vice-president in charge of the Sparta Division; George W. Lundee, of Muskegon, treasurer, and Mrs. Lou Keller, of Sparta, secretary.

Automotive Electric Assn. Moves Offices to Detroit

Offices of the Automotive Electric Association will be moved at the end of this month from Cleveland to Detroit. After April 1 the new address of the association will be 800 Michigan Building, Detroit.

Brief **Specifications** and **Adjustments** of 1936 **Passenger Cars.** Published by Ethyl Gasoline Corporation, 723 East Milwaukee Ave., Detroit, Mich.

The information contained in these condensed specifications was supplied by manufacturers of cars, carburetors, ignition units, etc.

"What is a **Safe Automobile?**" by Thorsten Lund.—Distributed by the Minnesota Public Safety Committee, St. Paul. Instructions to prospective purchasers on evaluating the safety features of motor cars.

Thermal Expansion Characteristics of **Some Nickel Cast Irons**, reprinted from the June, 1935, Transactions of the Society of Metals.—The International Nickel Company, Inc., 67 Wall Street, New York, N. Y.

The Direct-Control Autogiro—The Autogiro Company of America, Willow Grove, Pa.

F. L. PIERSON has been elected a director of the Eaton Mfg. Co. to succeed C. M. Higbie who is retiring. Mr. Pierson was president of the Detroit Motor Valve Co. when that concern was purchased by Eaton last year.

A. C. ANDERSON has been appointed comptroller of the General Motors Corp., succeeding E. W. Proctor who has been granted a leave of absence. Mr. Anderson has been with General Motors since 1909.

JAMES M. DEGNAN has been appointed general sales manager of the Hill Diesel Engine Co., Lansing, Mich. For the past 10 years Mr. Degnan has been associated with the Worthington Pump and Machinery Corp.

STORRS J. CASE, who has been sales promotion manager of the Nash Motors Co., has been promoted to the position of Eastern sales manager. He is succeeded by **JOHN REESER**, who has previously been engaged in sales promotion work for Nash.

New United Aircraft Issue Chiefly for Expansion Use

The United Aircraft Corp. has applied for an additional listing of 417,555 shares of capital stock at $15 per share, bringing the corporation's total listing to 2,620,875 shares. Approximately $2,250,000 of the net proceeds from the new issue will be used to repay bank loans. For the enlargement of the engine and propeller manufacturing divisions, $1,500,000 will be allocated, while the balance will be used for additional equipment and working capital.

Buick's Thousand Best Salesmen to Be Honored

One thousand crack salesmen of the nation-wide Buick retail organization shortly will receive special recognition of their abilities, according to announcement by W. F. Hufstader, general sales manager. This special recognition will be a three months' membership in the Buick Salesmaster's Club, newly created merit organization which will take the place of the Buick "Thousand Point" Club. In addition, special awards will be made to the winning salesmen in each Buick zone.

William P. Kelly

William P. Kelly, comptroller of the International Harvester Co., died at his home in Highland Park, Ill., last Monday. Mr. Kelly was 52 years old. He had been with International 20 years, a part of which was spent in Russia as general auditor for the company.

CALENDAR OF COMING EVENTS

SHOWS

Hungary, Automobile Show, Budapest, Mar.-April

Illinois Automotive Parts Assoc., Maintenance Exhibit, Navy Pier, Chicago, April 4-8

Portugal, Automobile Show, Lisbon, begins April 16

Yugoslavia, Automobile Show, Zagreb, May 2-11

Foundry and Allied Industries Exposition, Detroit .....May 4-9

Spain, Automobile Show, Madrid, May 10-20

International Aero Exhibition, Stockholm, Sweden .....May 15-June 1

International Petroleumn Exposition, Tulsa, Okla. .....May 16-23

Morocco, Fair of Tangiers.....May 16-24

Yugoslavia, 16th International Spring Fair, Lubliana.....May 30-June 11

France, Automobile Exhibit at Foire de Paris .....May

Norway, Automobile Show, Oslo.....May

Olympia Motor Show, London, England, Oct. 15-24

National Automobile Show, Grand Central Palace, New York.....Nov. 11-18

International Aviation Show, Paris, France .....Nov. 13-29

Natl. Exposition of Power & Mechanical Engineering, Biennial Meeting, New York City .....Nov. 30-Dec. 5

International Commercial Motor Transport Exhibition, London, England, November

CONVENTIONS AND MEETINGS

American Chemical Society, 91st Annual Meeting, Kansas City, Mo....April 13-17

S.A.E. Tractor and Industrial Power Meeting, Milwaukee, Wis...April 15-16

American Gear Manufacturers Association, Twentieth Annual Convention, Philadelphia.....April 20-21

S.A.E. Production Meeting, Detroit, Mich. .....April 21-24

Natl. Metal Trades, Annual Meeting, New York City .....April 22-23

U. S. Chamber of Commerce, Annual Meeting, Washington .....April 27-30

American Foundrymen's Association 40th Annual Convention, Detroit, May 4-9

American Petroleum Institute Mid-Year Meeting, Tulsa, Okla..May 13-15

National Battery Manufacturers Association, Spring Convention, Cleveland .....May 20-21

American Iron & Steel Institute, Annual Meeting, New York City..May 21

S.A.E. Summer Meeting, White Sulphur Springs, W. Va. .....May 31-June 6

Automotive Engine Rebuilders Assoc. Annual Convention, Cincinnati, June 1-4

American Society for Testing Materials, Annual Meeting, Atlantic City .....June 29-July 3

National Association Power Engineers, Annual Meeting, Chicago, Aug. 31-Sept. 4

American Society for Metals, 18th Nat'l Congress, Cleveland, O.....Oct. 19-23

American Gas Association, Annual Meeting, Atlantic City.....Oct. 26-31

American Petroleum Institute, Annual Meeting, Chicago .....Nov. 9-12

Natl. Industrial Traffic League, Annual Meeting, New York City....Nov. 19-20

28 States Share Motor Employment

More Than a Fourth of the Factory Workers Are Employed Outside Mich.

Despite the great concentration of the automobile industry around Detroit and other Michigan cities, more than one-fourth of the employment in automobile factories is outside of Michigan, and is distributed over 28 states, from Coast to Coast and from the Canadian to the Mexican border. This was disclosed in a survey just completed by the statistical staff of the Automobile Manufacturers Association.

The Association's report refers exclusively to automobile plants and does not include the much greater distribution of jobs in automobile parts and accessory plants, tires and other large industries which supply materials for automobiles. It also leaves out the millions employed in automobile selling, servicing and repairing.

The out-of-Michigan employment is accounted for by a considerable number of independent automobile and truck manufacturing plants, and by increasing decentralization of assembly operations on the part of the large scale manufacturers. In both January and February, the out-of-Michigan plants employed between 95,000 and 100,000 men, out of an average of 360,000 for all automobile factories.

States with automobile factory employment in excess of 5000 in February were: Ohio, 18,894; Pennsylvania, 14,147; Indiana, 14,418; California, 5511; Missouri, 8743; Wisconsin, 7479; and New York, 7397.

Other automobile factory employment was distributed over the following states: Colorado, Florida, Georgia, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, North Carolina, North Dakota, Oklahoma, Tennessee, Texas, Utah, Virginia and Washington.

GM Will Spend $200,000 On Packard Electric Plant

Expenditure of $200,000 on its Packard Electric Co. plant is to be made by General Motors Corp. soon, according to William Knudsen, vice-president. The outlay will include construction of a new building with approximately 50,000 sq. ft. of floor space, improving of the old structure and addition of about $50,000 in equipment.

Buick Arranges Broadcast of Schmeling-Louis Fight

Harlow H. Curtice, president of the Buick Motor Co., and an ardent fight fan, announced that Buick will sponsor the broadcast of the Schmeling-Louis fight scheduled for New York this summer.

The German

WORK on the German super-highways is proceeding rapidly, and not only the passenger-car but also the commercial-vehicle industry is preparing to meet the demand for vehicles capable of sustaining high speeds. It is frequently supposed that these highways are intended primarily for passenger-car traffic. That, however, is not the case. They are to be used by the German Railway and the German Post-Office Department for their express-goods and passenger (bus) services, and the sections of the system which have been completed are being used regularly by these and private motor-transport organizations. As these super-highways have only few and light grades, and all of their curves are of large radius, there is practically no limit to the possible speed, and German makers now fit their fast buses and trucks with overdrives in order to keep down engine speeds. A number of horizontal Diesel engines have been developd for bus work, some of them very powerful, while for goods transportation and military purposes a number of all-wheel drive vehicles have been brought out. In Germany a train of cars may now have a total length of 72 ft., which permits of the use of two trailers, and for a truck that has to haul two trailers, the all-wheel drive naturally offers advantages.

During the past year the number of gas-producer plants available has increased greatly, and all German makers now offer vehicles equipped with them. But most of the manufacturers, it must be confessed, are not very keen on this development. It is recognized that from the standpoints of national defence and national economy the advent of the gas producer has its advantages, but its weight, the loading space it takes up, and the reduction in engine output (up to 40 per cent) it causes, quite apart from the increased service and maintenance costs it involves, are serious drawbacks. It is true that the latest gas-producer plants are incomparably better than the early ones, and they stood up well in a hard, long-distance trial carried through last fall with about four dozen trucks running on native fuels, under government auspices. Plants are now available which

European Photo

This big truck shown at the German Truck Show carries a railroad freight car and its load

Keystone Photo

At the right is a view of Germany's largest truck. It is Diesel powered and 72 ft. long

Truck Show

High speed Diesel trucks and buses for new super highway use, horizontal engines for space conservation, all come to the front at the Berlin Show with light Diesel trucks and gas producer plants for low cost fuels prominent.

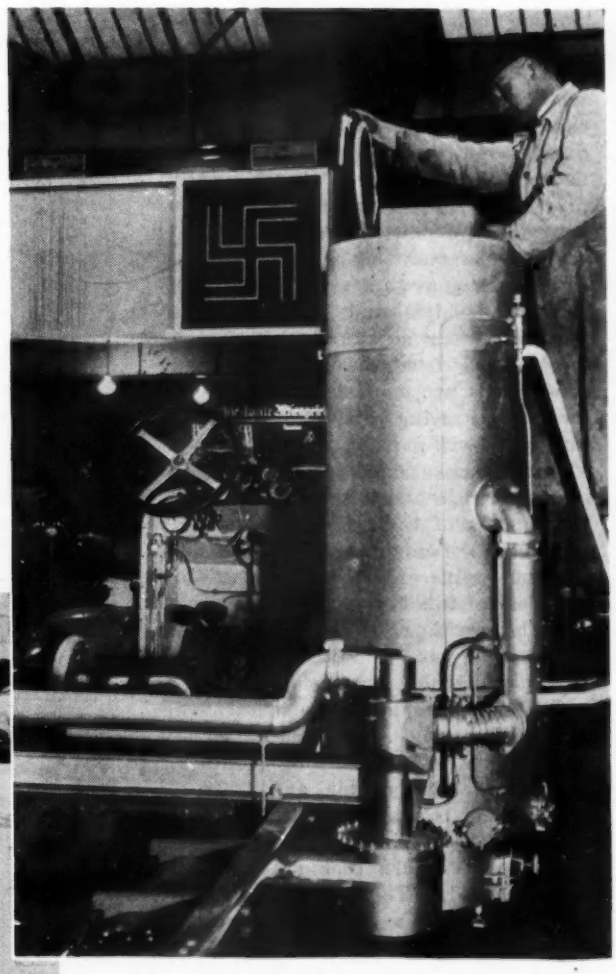
By Edwin P. A. Heinze

will run a vehicle a distance of 300 miles on one charge. The latest development in this direction are anthracite plants, but wood, charcoal and coke gas producers are also being offered.

An interesting development is the appearance of a large number of small and, in some cases, primitive types of tractors equipped with one- or two-cylinder Diesel engines, generally fitted in or behind the cab.

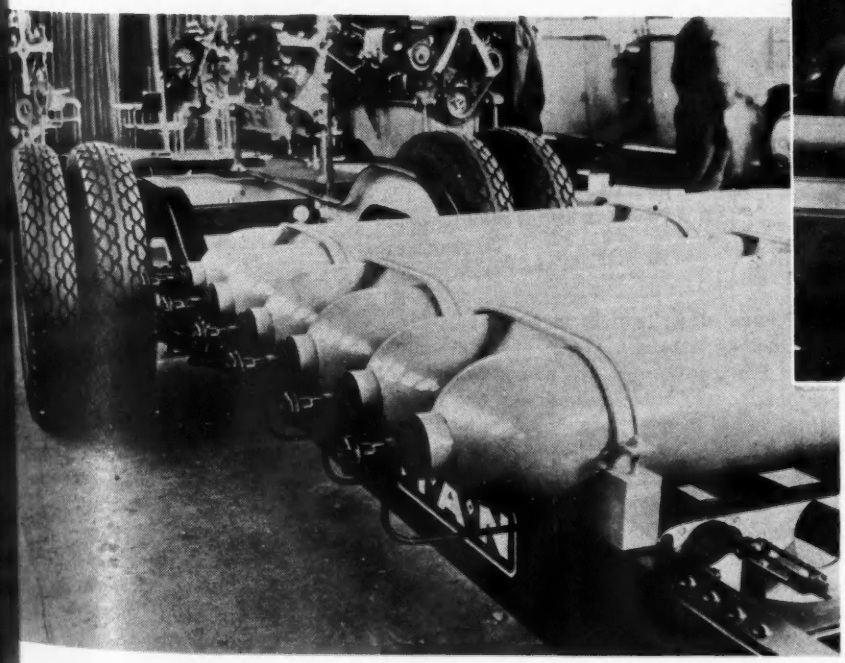
The use of compressed or liquefied gases has not made much headway as yet, as the organization for the distribution of these fuels is being built up only slowly. In any case, this fuel appears to be adapted only for use in vehicles operating in a limited territory, such as municipal vehicles (street sprinklers, ash trucks, etc.). The drive for the use of native fuels is reviving the interest in electric trucks, of which samples were shown by four makers.

One of the most interesting large vehicles at the show was a Mercedes-Benz eight-wheeler with 100-hp. Diesel engine and all-wheel drive. This truck is intended for colonial work and is fitted with tires having deep anti-skid formations on the treads. All wheels



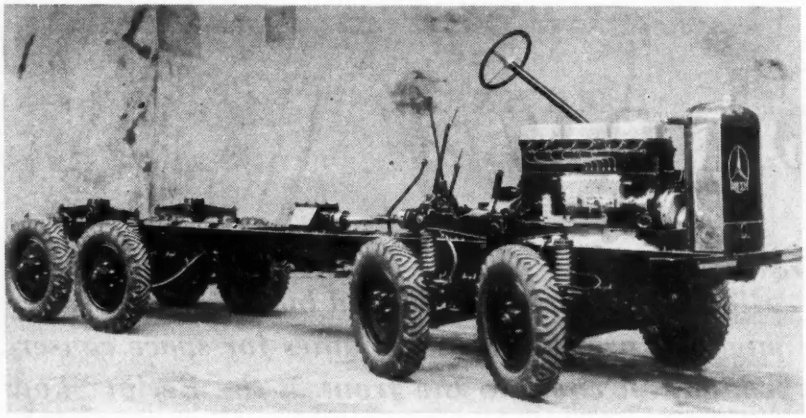
A 3½ to 4-ton truck made by Krupp with generator for the use of hard coal

Wide World Photo



Acme Photo

(Left) Gas-propelled truck shown at the Berlin Truck Show



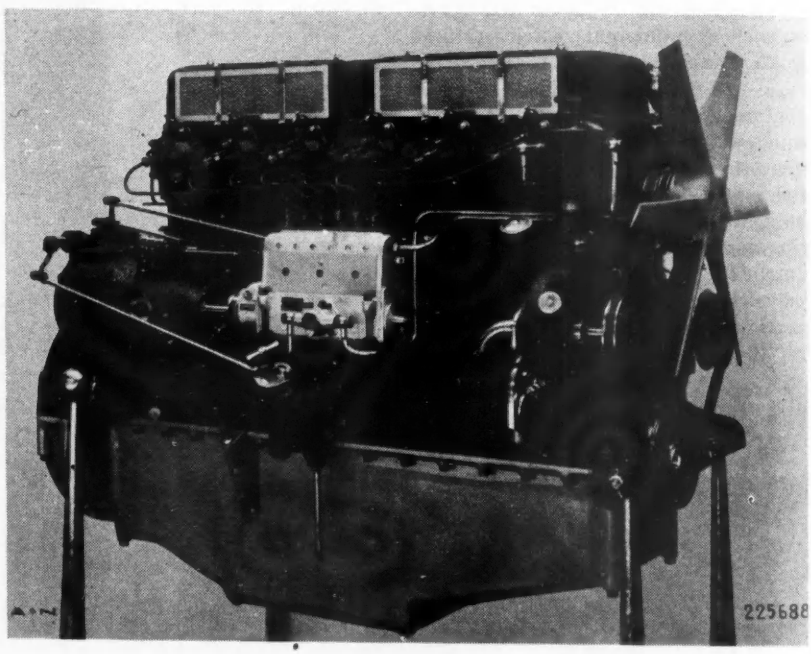
Mercedes-Benz cross-country eight-wheel chassis with 100-hp. Diesel engine, all-wheel drive and independent suspension on coil springs all around

are independently sprung, each being held by two superimposed parallel links hinged to the differential casing, which is mounted beneath the frame. Springing is by means of open coil springs resting on the upper links and supporting balance levers fulcrumed on the frame side rails, which equally divide the load between two adjacent wheels. All German makers employ the same general lay-out for all-wheel-drive power transmission. The engine is mounted high up on the forwardly projecting part of the frame and the power is transmitted through a (generally separately mounted) five- or eight-speed gear to a transfer gear located amidships, and thence to the front and rear axles. In the case of the Mercedes-Benz, the worm-type final drive gears are carried on the frame, the wheels being driven by jointed shafts. Steering is by the four front wheels, which are interconnected by a system of rods and levers.

A number of vehicles were shown in which the driver's seat is located beside the engine. Mercedes-Benz exhibited a car of this type, with a luxurious sedan body, referred to as a conference and sleeping car. It is intended to afford comfortable, long-distance travel facilities for people who wish to have their office always with them and who desire to be independent of railways and hotels. The engine and driving compartment is entirely partitioned off. Behind the seats in the driver's compartment there are cooking facilities and cupboards. Then follows an entrance hall with a door on the right. From this one enters the sedan, furnished with a large and a small table, six club chairs, and cupboards in the corners. Through a further door one passes into the sleeping cabin with lavatory. The vehicle is equipped with a six-cylinder 95-hp. Diesel engine. It has an all-steel body and the engine is mounted on a subframe and can be rolled out of the vehicle after loosening a few bolts. The same chassis is supplied with various types of bus bodies.

A further addition to the Mercedes-Benz line is a new six-wheeler of ten tons carrying capacity. It is of conventional design, with six-cylinder, 150-hp. Diesel engine, five-speed transmission and an over-drive unit, which latter enables the truck to attain a speed of 47 m.p.h. The two rear axles are connected by a short torque tube. A double-reduction final drive is used, the drive being through bevel gears in the center housings and spur gears at the wheels. Mercedes-Benz also has made an addition to its line of light Diesel trucks, using the four-cylinder, 150-cu. in., 45-hp. engine developed for the passenger car. This is the smallest Diesel-engined truck on the market.

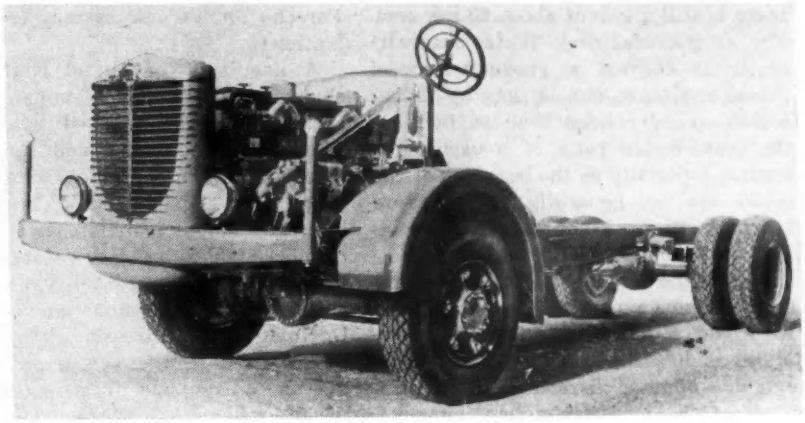
The Buessing-N.A.G. company has brought out some interesting new models, including a line of bus chassis with driver's seat beside the engine. Three of the four chassis have vertical engines, but the largest one, a six-wheeler, has an underslung, horizontal, six-cylinder, 140-hp. Diesel engine. This precombustion-chamber engine has dual valves and the crankshaft runs in seven large roller bearings on cylindrical webs which, like the crankpins, are case hardened. The overhead camshaft is driven by a horizontal shaft. The gearbox is separate and the two rear axles are separately driven through a transfer gear, as formerly. The older six-wheeler now has a new vertical six-cylinder 175-hp. Diesel engine. Like the horizontal engine, it has wet liners and dual valves. A further new model is a six wheeler with all-wheel drive.



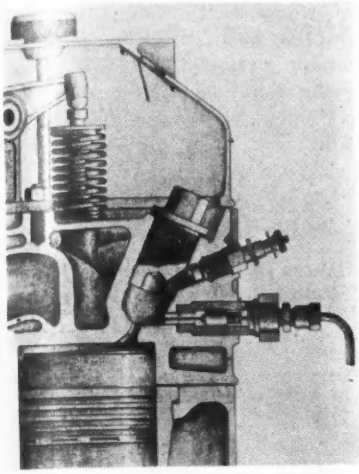
M.A.N. six-cylinder 150-hp. Diesel engine

Henschel & Son Company, who several years ago introduced a chassis with double-six carburetor engine developing 250 hp. (two six-cylinder blocks mounted side by side on a common crankcase), have now introduced a six-wheel express coach chassis fitted with

Bussing-N.A.G. four-wheel-drive tractor



Section of Thomas-Stuhr Diesel combustion chamber

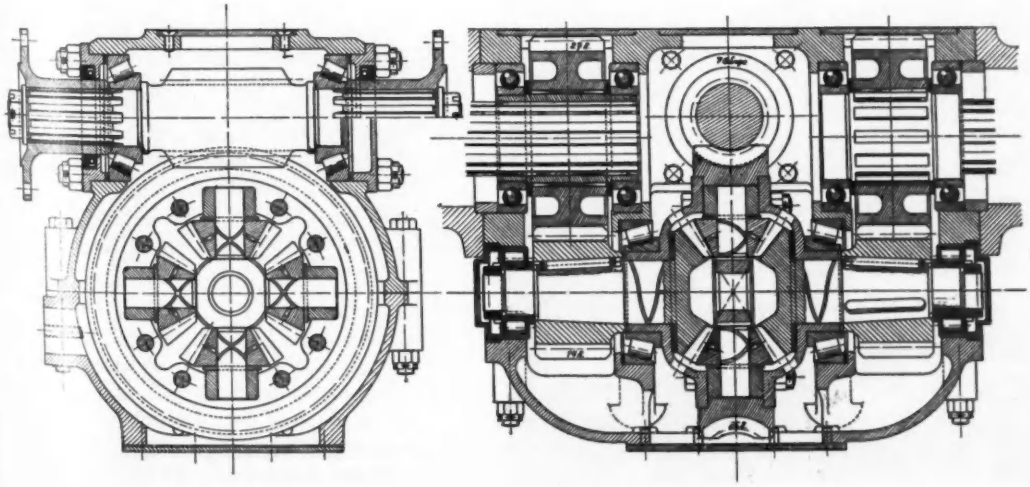


a 12-cylinder, horizontally-opposed Diesel engine of the Lanova type, developing 300 hp. at 1500 r.p.m. Cylinder dimensions are 5.31 by 7.08 in. and the piston displacement is 1890 cu. in. The whole engine block consists of castings of heat-treated silumin (aluminum-silicon alloy) and has wet cylinder liners, the block being divided vertically through the crankshaft axis. The crankshaft runs in floating lead-bronze bearings. The pistons of one block are linked to the bearing caps of the connecting rods of the other block. Each block has a separate Bosch fuel injection pump, these pumps being fitted with the Henschel patent torque-control valves, which have the effect of increasing the fuel quantity injected per cycle for a given control setting with a decrease in speed. Thus the torque also increases with a decrease in speed and the "lugging ability" of the engine is improved. There is one cylinder head for each pair of cylinders. The valves which close the auxiliary air chambers and thus increase the compression ratio for starting, are closed by compressed air. The normal compression ratio is only 12.5 to 1, but as the compression ratio for starting is raised, no electric heating plugs are fitted. Valve seats are screwed into the silumin heads, and valve guides are pressed in. Two 15-hp. electric motors serve to start the engine. A hydraulic governor, utilising the oil of the engine lubrication system, is fitted. Coupled to the injection pumps are Bosch air compressors which supply the air required for the brakes, for power steering, and for operation of the starting valves just described.

Metal universals with needle bearings are now used. The differential is driven by an overslung worm, and mounted on the two stub axles of the differential gear are two spur pinions which mesh with the spur gears on the inner ends of the axle shafts directly above them. The inner ends of the axle shafts terminate at the worm-gear housing and are, therefore, on a level with the worm. By this arrangement it was possible to obtain a very low floor.

Another new Henschel six-wheeler is fitted with an eight-cylinder, 160-hp. Lanova Diesel engine and has the driver's seat to the left of the engine. In one chassis shown, the 12-cylinder carburetor engine was adapted to run on compressed or liquefied gas. Several chassis were shown fitted with wood-gas generators. It is of interest to note that development of the Doble type steam chassis is continuing and that the German railways now have 10 of these large 100-hp. trucks in service—five more than last year.

Many commercial vehicles in Germany are being converted to operation on producer gas, and the conversion is made on Diesel rather than on carburetor engines. With the latter the conversion is accompanied by a drop in engine output of up to about 40 per cent, unless the compression ratio is raised to 7 or 8 to 1, and even then



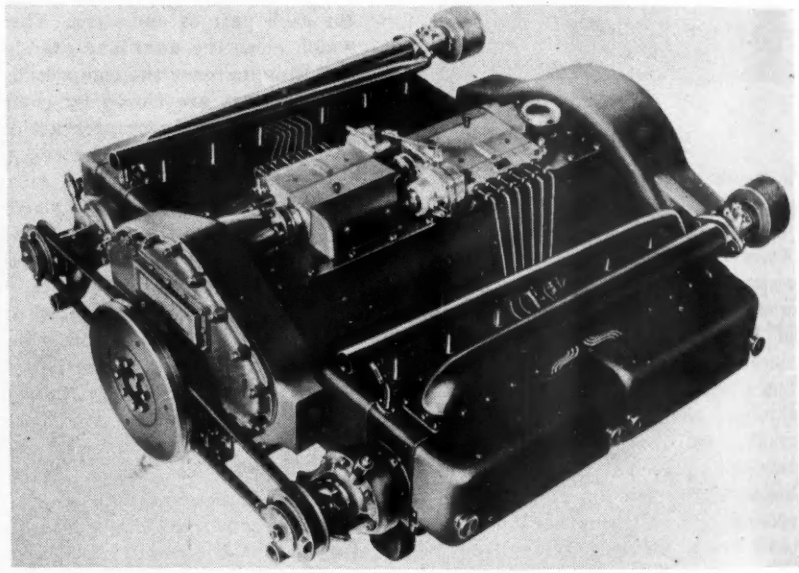
Henschel double-reduction (worm and spur gear) rear-wheel drive

there is still a loss of about 20 per cent. For a manufacturer it is naturally easier to convert a production-model Diesel engine to run on gas by fitting a new cylinder head than to increase the compression ratio of a carburetor engine, especially as the bearings of the latter are not generally calculated to stand the higher compression and combustion pressures. This practice is followed by the Magirus Company among others, which recently became affiliated with the Humboldt-Deutz Motor Co. Magirus has brought out a new 12-cylinder opposed horizontal Diesel engine of the precombustion-chamber type, but supplies the same engine with the necessary modifications (electrical ignition system and reduced compression ratio) for operation on gas. Cylinders have a bore of 3.74 and a stroke of 4.92 in. (650 cu. in.). The compression ratio is 19.5 to 1 and the injection pressure 1200 lb. per sq. in. The engine develops 164 b.hp. at 2000 r.p.m. as a Diesel and 110 b.hp. as gas engine running on producer gas. The projecting front end of the crankshaft is fitted with a vibration damper and also carries two belt pulleys for driving the water impellers fitted to the front of each cylinder head. The weight of the engine, including flywheel, generator and electric starting motor, is 1885 lb., or 11.5 lb. per hp on the basis of the Diesel rating.

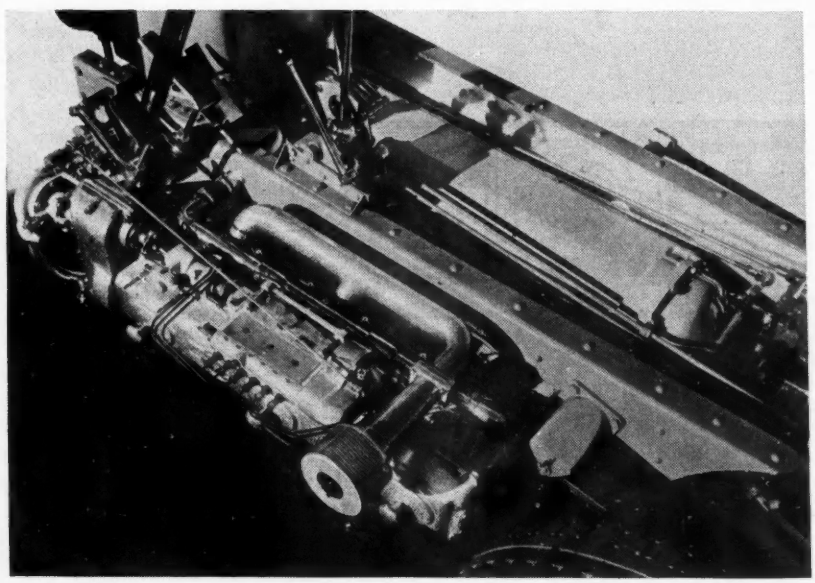
The Magirus Company has designed a high-speed, streamlined bus, in which this engine is employed. The engine is arranged at the rear and drives the two rear axles of the six-wheeler. This engine is also used in a new 6½-ton, four-wheel truck, and is then located amidships under the frame. A bus chassis with a 90-hp. Diesel engine has front independent springing by the Porsche torsion bar system (see illustration).

A new type of Diesel engine was shown by the Vomag Company. The system has been evolved by Messrs. Thomas and Stuhr and has now reached a production stage after many years of development work. The engine has a precombustion chamber over each cylinder, which communicates through a relatively large venturi-type passage with the main combustion chamber. During the compression stroke, air passes through the venturi at velocities up to over 3000 ft. per second. In the precombustion-chamber close to the top of the communicating channel the violent air current creates a low-pressure zone, and in this region terminates an open nozzle of about 0.10-in. bore. This nozzle is connected to the injection pump, more properly referred to as the fuel supply pump, which delivers the needed quantity of fuel. As usual with open nozzles, there is a check valve in the nozzle. Owing to the large size of the orifice, the pressure on the fuel during the injection period is very low. The Thomas and Stuhr system has been used for several years by the Flottmann Company of Herne, Germany, in portable air compressor sets, where it works with a compression ratio of only 11 to 1. In the Vomag engines compression ratios of 18 and 20 are employed. A number of truck and bus chassis on the Vomag stand were equipped with the Thomas and Stuhr engines. A 200-hp., eight-cylinder, horizontal engine is the largest now in production, but a 12-cylinder, 350-hp. engine is ready for production and is to be installed in a new express coach. In this the engine will be arranged at the rear, where it will drive four indepedently sprung wheels.

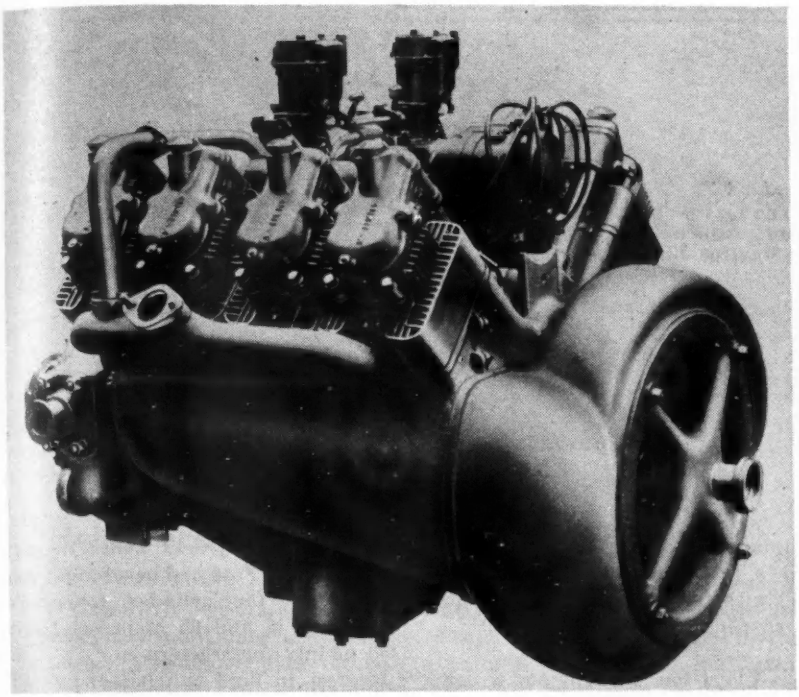
Phaenomen Works, which have been producing small air-cooled trucks for some years past with marked success, have developed a new and larger model



Magirus 12-cylinder horizontal opposed Diesel engine of 164 hp.



Bussing-N.A.G. six-cylinder horizontal Diesel engine of 140 hp.



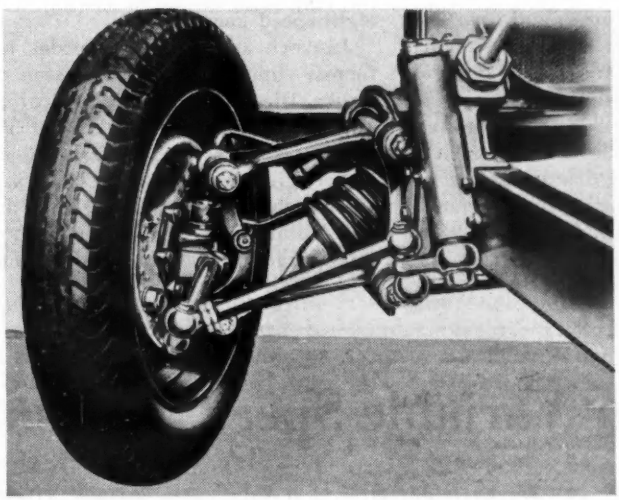
Krupp V-8 blower-cooled carburetor engine

with a four-cylinder, 183-cu. in. air-cooled engine developing a peak output of 58 hp. at 2800 r.p.m. It has a barrel-type crankcase and a crankshaft mounted in anti-friction bearings (one ball and two roller). The deeply-finned cylinders of 3.54-in. bore and 4.71-in. stroke are separately mounted on this crankcase. Pistons are of the Nelson-Bohnalite type and a compression ratio of 5.3 to 1 is used. Cylinder heads are of light metal and the valves located in side pockets. The camshaft is chain-driven. Cooling is by an air blast supplied from a blower on the forward end of the crankshaft and is thermostatically controlled. The chassis has a 2-3 ton rating but is used also for buses.

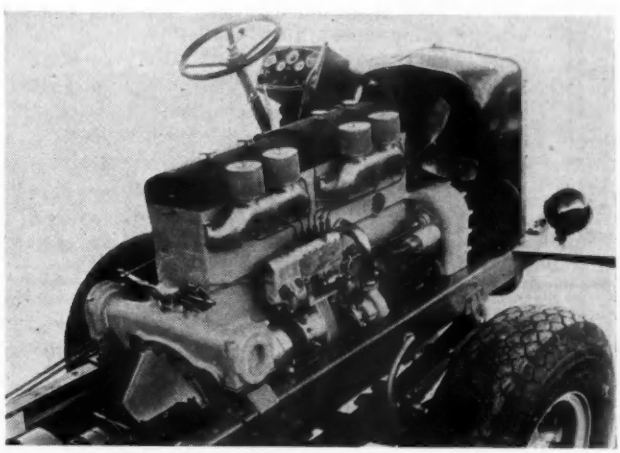
Messrs. Krupp have introduced a new all-wheel drive six-wheeler of the already known cross-country type with independently sprung wheels. This chassis is equipped with a new V-8 air-cooled valve-in-head carburetor engine developing 95 b.hp. Cylinder blocks are of iron, cylinder heads of aluminum. All fins are parallel with the cylinder axes and encased, and the blast of air from the blower on the front end of the crankshaft is forced upward through the channels thus formed. Connecting rod heads are forked to make it unnecessary to materially offset one cylinder bank relative to the other. With a bore of 3.34 and the stroke of 4.33 in., the engine has a displacement of 307 cu. in.

The Krupp Company has also brought out a new four-tonner with a three-cylinder, 90-hp. Junkers-Krupp two-stroke Diesel engine and another chassis of the same carrying capacity with a six-cylinder generator-gas engine.

The M.A.N. Company, who in 1923 produced the first Diesel engine for road vehicles, a four-cylinder, 45-hp. unit that was to be seen in the Court of Honor, has now adopted the air-cell type of construction also for its high-powered engines. A new 6½-8-ton chassis in sectioned or cut-away form was shown on the stand. It is a four-wheeler and the rear axle has dual reduction, the final reduction being at the wheels. The Diesel engine for this truck is of a new design and produces 150 hp. at 1700 r.p.m. M.A.N. casts all six cylinders and the upper section



Front independent suspension of Hansa Lloyd truck

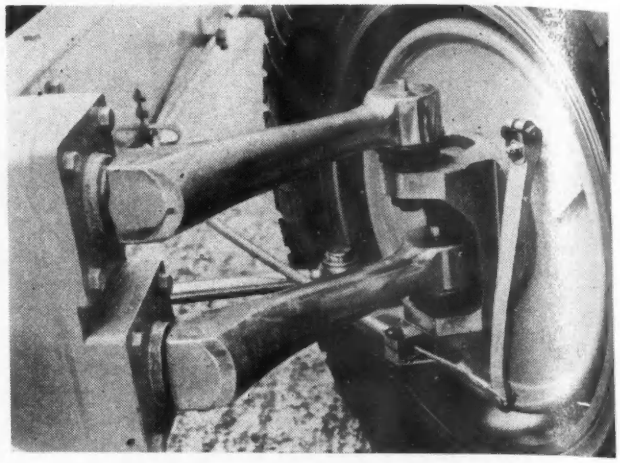


Bussing - N.A.G. six-cylinder 175-hp. Diesel engine with dual valves

of the crankcase in one block without removable liners. Cylinder dimensions are 5.31 by 6.1 in. (815 cu. in.). The compression ratio is 15 to 1. There was also shown on the M.A.N. stand a 4-ton truck chassis fitted with a battery of containers for compressed or liquefied gas, mounted across the frame. This truck has a carburetor engine, which can run on either gasoline or on gas at the will of the driver. In all M.A.N. vehicles both the drive and the torque are taken up by the rear half-elliptic springs.

Faun works, which specialize in the production of municipal vehicles, now employ Humboldt-Deutz Diesel engines converted to run on gas from anthracite-gas generators. However, all vehicles can be had also with Diesel engines, as in the past.

The Hansa-Lloyd Company has introduced a new high-speed 2½-tonner, which is offered with either a 75-hp. carburetor or a 60-hp. Oberhansli Diesel engine, top speeds with the two engines being 53 and 47 m.p.h. respectively. An interesting feature is the front independent suspension, by parallel links of equal length pivoted on the side of the frame, and two concentric coil springs between supports on the lower link and the frame side rail, as shown in the photograph reproduced herewith. Midway between the two links may be seen the arm of the double-action hydraulic shock absorber. The steering gear is mounted on the left side rail, its driven shaft extending downward at an angle and the pitman connecting to the knuckle arm by a link extending substantially parallel with the lower link. All joints of the suspension are of the Silentbloc type.



Torsion-bar front-suspension of Magirus buses

Hansa-Lloyd has brought out a new 4-tonner with eight-cylinder, 100-hp. Diesel engine and Faun a new six-wheeler with an eight-cylinder, 150-hp. Humboldt-Deutz Diesel engine and an eight-speed gearbox.

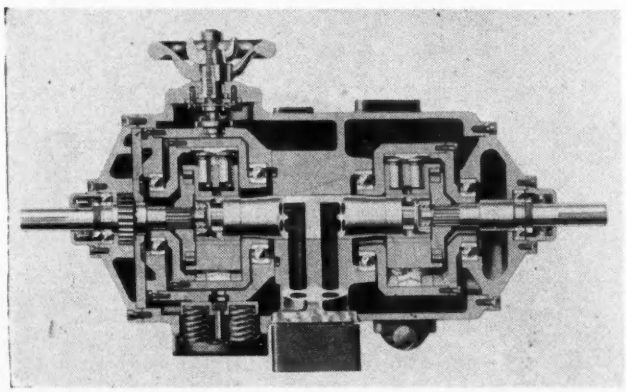
Junkers added a new model to its former line of opposed-piston two-stroke Diesels. It has four cylinders and develops 165 hp. at 1600 r.p.m. with a compression ratio of 16 to 1. The engine weighs 2170 lb. dry and has an over-all length of 67½ in. Junkers Motorenbau has taken over the small, high-speed Diesel business of the Linke-Hofmann Works under the new firm name of Famo. The product consists of two four-cylinder, four-stroke engines of 45 and 65 hp. respectively, used mainly for tractors.

Interest in fluid clutches and torque converters is increasing in Germany. Krupp some time ago acquired the manufacturing license for the Lysholm-Smith torque converter as used by the Leyland Company in England, while the Vulcan Works at Hamburg are pushing the Vulcan-Sinclair fluid clutch. Deutsche Getriebe G.m.b.H. in Berlin and the Magirus Company have brought out gearboxes of the preselector type suitable for road vehicles, that of the Magirus Co. being of Puls design, hence this type of transmission too is making progress in Germany.

Oilgear Variable Speed Transmission Simplified

The Oilgear fluid power variable speed transmission for machine application has been simplified and improved by a redesign of input and output units, eliminating many parts.

Developed by The Oilgear Co., Milwaukee, Wis., this transmission consists of a volumetric variable displacement pump driving a constant displacement motor. Lubricating oil which is used as the power fluid, flows from unit to unit through drilled and cored passages provided for that purpose. Smooth, controlled, steplessly variable speed in either direction is said to be provided. Tests indicate a starting efficiency from a dead stall under normal load of 88 per cent, with a rapid increase up to 97.5 per cent as the output shaft begins to rotate. These transmissions are available in sizes from 2 to 100 hp. and are controllable either by hand or by automatic devices.



The Adam Opel Company, German subsidiary of G.M., has marketed a new small car with a four-cylinder engine of 67 cu. in. displacement, which takes the place of another model with 73 cu. in. displacement. The principal change seems to be that the engine is of the short-stroke type, the cylinder dimensions being 2.66 in. bore by 2.95 in. stroke, as compared with 2.56 in. bore and 3.54 in. stroke for the superseded model.

JUST AMONG OURSELVES

"Hold Back" on Car Discounts

A DEALER we talked to recently mentioned the virtues of the "hold-back" plan on factory dicounts to automobile dealers. This scheme, under which he had operated in the past, is for the factory to reserve a definite percentage of the discounts due dealers in current accounts, and to pay this out at the end of the year as a lump sum.

The present possibilities of the plan, according to our informant, have to do with used-car loss control. Many car dealers are said to be so limited as to working capital that they are forced to keep their used-car trading within fairly sound limits. Their working capital is provided chiefly by factory checks for discounts on new cars sold. If this discount, as a current item, would be reduced without restricting the total accruing to the dealer in a year, used-car losses might be reduced. This seems to us to belong to the sleight-of-hand department, but there's always the possibility, despite its rather childish implications, that it might work.

Industry Needs Flood Relief Too

THE flood of legislation aimed at the motor-vehicle industry and its subsidiary interests has not subsided. We are reminded forcibly of this fact by Bulletin No. 8 of the National Highway Users Conference, which is titled eloquently "Some More Laws," and which lists the results of some amazing examples of the imaginative quality of the legislative mind. There's hardly any subject connected with motor-vehicles on which legislators have not been able to figure out a peg for hanging taxes, or investigation, or restriction. Almost every branch of the automotive industry needs flood relief.

British "Invasion" Scheduled for July

AN organization of British motoring enthusiasts called the Junior Car Club has organized a "rally" which will bring a number of members of the organization, with their cars, to the United States and Canada at the end of July. The idea has proved so popular that the number of reservations for the trip exceeds already the provision which has been made.

In commenting on the tour, a British motoring publication remarks: "It is hoped that (British) manufacturers will seize this opportunity of showing America what British cars are really like."

Such a pious hope finds a ready second in these columns, but we're wondering if the British visitors are not more likely to return home with their dominant memory not so much of having impressed the natives, but of the amazing performances which are hung up every day in a land where automobiles are an everyday necessity and not a subject of sporting interest.

We have long had a soft spot in our hearts for British sports cars of the type of the Bentley and Alvis, but a general comparison between the whole range of American cars and the whole range of British cars would, we are afraid, leave many British owners yearning for the comfort and power of the American product.

None of these things will obtrude too much, we hope, on the hospitality which is being organized for the entertainment of the Junior Car Club visitors.

More Coordination For Safety Work!

SEVERAL of our recent correspondents emphasize the view that permanent achievement of safety on the highway depends upon basic education rather than sporadic campaigns in which the horror-element in motor-vehicle accidents is stressed. Hundreds of organizations are rushing into print with well meant, and possibly effective ways of educating the public to more careful use of the highways. Several laudable efforts to coordinate such activities and so increase their effectiveness are under way. The framework exists for such coordination on the broadest possible lines. The immensity of the problem is staggering.

It is still our hope, however, that out of the present welter of thinking on the subject there will emerge a plan for highway-safety education on a national basis, taking into account the peculiar requirements of the various groups to be educated, and providing for consistent effort to see that these groups are reached with the necessary implements for their education. We expect to receive on publication of this note, a number of letters asking "Haven't we heard of such and such a plan and how it provides all the answers?" Coldly faced, we believe no plan yet offered provides a complete answer. What do you think about.

—H. H.

Nothing Radical

is expected in the 1937 models but 1938 should bring forth some real innovations in automobile construction and design.

By Joseph Geschelin

"I'LL have to think back to the 1937 models because we are busy working on the 1938 jobs."

This remark by a research engineer epitomizes the new-model situation in many an automobile manufacturer's plant—today.

What disturbs us is the paucity of rumors and "wise" comment on the new cars. Nothing startling is bruited about—and that may mean much or little. So far as we can learn from well-informed engineers the general trend will be much as we found it for 1936, that is, a conscious program of improvement and refinement without the radical fringe that was freely predicted some months ago. There are good reasons for this attitude. In the first place public acceptance has been so marked that neither radical design nor great change seems necessary to provide further stimulus to sales. In the second place, the larger companies want a little more time to prove the virtues of new construction before announcement to the public.

In the opinion of some engineers, certain radical moves are due to be made for 1938 but are hardly likely in the coming season.

Apparently it would not be surprising to find at least two new light sixes on the market, both originating with independent producers.

For a generalized picture we may speculate on the probabilities by examining car design in detail. Here are some of the main topical headings:

BODY TRENDS—Nothing radical is expected before 1938, the general tendency being further refinements for eye appeal, and changes to improve comfort and safety. Floors will move closer to the ground, leading to the ultimate elimination of running boards, while roofs may remain at the same level so as to provide more head room.

There seems little doubt that the frameless construction pioneered by Lincoln-Zephyr in volume production dominates the thinking of body designers. One prominent body engineer told us that his company has developed a structure which will place this type of body on a very economical production basis. It is very likely that this job may be adopted for the coming season but if not it will surely come in 1938.

An important variation in body framing is the use of tubular members as on the Stout Scarab and the Gar Wood bus. There is a production design in the offing which hinges on the development of a welding process in which the whole thing may be framed in a buck and welded in one setting automatically. If the welding process is found commercially practical, the tubular framing holds great promise for passenger car and bus bodies.

CHASSIS FEATURES—It is an open secret that a number of independent organizations have been playing with rear engine drive for several years. But it's a matter of interest that some of the car builders have been doing the same thing recently. It is possible that at least one of these jobs may be offered the public this coming season but more likely that its introduction may be delayed for yet another year.

In the meantime we learn that another front drive design is being developed by a small organization with some financial backing.

Hypoid gearing for rear ends is coming strongly to the fore and is really an essential factor in the move to lower the floor.

Overdrive transmissions have taken the town by storm and will be evident on more models, probably as optional attachment on lower-priced cars.

Evidently the automatic transmission has not yet reached the announcement stage, although it might not be at all surprising to find one on a high-priced car. There are at least three different designs in the final stages of development but the larger backers are convinced that they should not be offered to the public before they are fully foolproof and commercially practicable. One of the larger transmission builders believes that a real production job, although probably of high price, should be available within two years.

SPRING SUSPENSION — Those manufacturers who have been in the field with independently sprung front ends are confident that this type of wheel suspension is here to stay and that the only bar to wider extension in their low-priced units is its cost. Not only is this true but several of these car builders are definitely grooming independent springing all around and something along that line should be ready to spring for 1938.

In the meantime we have the outside organizations ready to contribute to this development—Coleman with a tubular backbone and single cylinder suspension at each end, the Firestone air spring, the improved Leaf Spring Institute transverse spring design, and the Monroe system of swaybar-shock-and-linkage control.

ENGINEERING MATERIALS— There are two schools of thought when it comes to the selection of materials. On the one hand there is a decided leaning to the use of lower-priced alloy steels and a growing tendency to use plain carbon steels wherever advisable. And recently there has come to the fore another group of designers which is strong for high-priced alloy steels which might be used to effect weight reduction. By proper design and selection of such materials, the net cost of the car may not be higher than it is at present.

The use of castings for camshafts and crankshafts is growing very rapidly and it would not be at all surprising to find several car makers featuring cast crankshafts. The new cast alloys also are spreading into the field of brake drums and pistons, so that Ford may not be alone in the use of the light steel piston which has aroused so much comment this past year.

ENGINES—So far as we can learn, nothing radical is to be expected of engine design for 1937, unless we place in this category those who may adopt cast crankshafts and iron alloy pistons. As intimated earlier there may be at least two additional light sixes, and if the Franklin deal goes through, there will be an air-cooled job.

One of the rear engine drives has a four-cylinder horizontal-opposed engine which would be a novelty if and when it comes out. Then there is a small independent group in Detroit which has undertaken the development of a crankless, opposed-cylinder engine with 20 pistons, developing some 800 hp. This is being groomed for aircraft and rail-car use. Incidentally, this engine will run on fuel oil.

For 1937, engine design is expected to follow along present lines with natural improvement and refinement. The general tendency is toward smaller, lighter power plants packing a bigger punch, with power-to-weight ratio constantly greater. One of the dominating factors in this connection is the question of limiting compression ratio. There are apparently two schools of thought—one group of engineers believes that compression ratios will go higher; the other thinks that we have just about approached the limit with present regular fuels. It is not inconceivable that current fuel research may open the way for further progress along this line.

The supercharger holds great promise for the immediate future. Thus far, Graham is the only large production car using it as standard equipment with outstanding success; Auburn, of course, has been using it on the Supercharged model.

With the possibility of still higher compression ratios in the offing, there should be a new stimulus in the use of special cylinder heads. The place of the aluminum head is well established. Then there is the recent entry of the

C. W. C. copper-insert head which seems to hold great promise. The all-copper head development is well under way and may find its first uses on heavy-duty truck engines and marine conversion units where maximum power output coupled with better fuel economy are essential requirements.

Engineers have viewed with some concern the emphasis on high fuel economy claims insisted upon by the advertising department. They have found it possible to compromise on fairly reasonable claims which have been substantiated in actual service. However, these claims bring up the question of public education as to the conditions under which high economy may be expected. Of course the safest figures to quote in advertising are those obtained under normal operating conditions.

Cylinder wall finish, piston rings, and pistons are undeniably linked. Ford has shown the way with the use of single-point boring of cylinders and a related process developed by Heald has been used at Cadillac. There still remains a difference of opinion as to the character of the cylinder wall surface, though it is agreed that the bore must be perfectly round, truly concentric with the axis, and as close to perfect smoothness as is practicable.

The piston situation has resolved itself into aluminum and cast iron alloy. At the moment the aluminum piston predominates, except on the Lincoln-Zephyr, and it may not be surprising to find more of the iron alloy pistons in use very soon. Aluminum pistons are preferably anodized for greater surface hardness and here, too, developments are looming under the surface. At the moment the anodizing process has utilized a bath energized with DC current; and now we find available an AC current process which is said to have been adopted by one of the car manufacturers.

One of the most promising developments in recent years is the zero-clearance valve lifter pioneered by Wilcox-Rich, being an outgrowth of the lifter adopted by Pierce-Arrow some years ago. While it has many important features, unquestionably its greatest appeal lies in the fact that the tappets require no adjustment at any time and consequently permit an engine layout in which the valve covers may be altogether inaccessible. What with high fenders and new styles in body framing, this type of valve lifter relieves the designer of one of his most serious service problems. In addition, the automatic valve lifter increases the cycle of valve events and improves the torque curve and power output materially.

Cadillac uses a valve lifter of this type on its present V-8. It is only a question of time before several other makes, at least in higher-priced models, will adopt a similar construction. We may or may not see it for 1937 but it's bound to come in 1938. In fact, if sufficient demand is found so as to justify special production equipment, the price may come down sufficiently to interest producers of even lower-priced units.

The engine bearing problem perhaps is no longer as acute as it was during the past few years, principally because of engine changes resulting in better cooling and greatly lowered crankcase temperatures. Bearing manufacturers are now working on improvements in the babbitt alloys, anticipating a rebirth of their use. However, the special alloys such as copper-lead and cadmium-silver are very much in the foreground, particularly on heavy-duty engines for truck, bus, and marine service, and are practically indispensable for automotive diesels.

Designers are working on lower floors and more head room.

Engineers are still playing with rear engine drive.

Parts and accessory field has novelties in the offing.

Improved headlights are a necessity with a coming solution.

Engine trend toward greater weight-to-power ratio.

ELECTRICAL SYSTEMS — It is perhaps too early in the season to talk about the probable specifications of electrical systems for the coming year. It is certain, however, that large-sized generators with fool-proof regulation are very much in the picture. Auto radio is no longer a novelty and its application must continue to grow. In fact the big problem is the development of better antenna installations now that the steel roof predominates.

In addition to radio there is the widespread use of car heaters, defrosters, cigar lighters, and other current-consuming devices such as the windshield wiper that the public will demand as a matter of necessity. These attachments more or less define the size of the generator.

The ideal system is one in which the generator is of ample capacity to handle current-consuming devices together with the rapidly growing headlighting power demand. Under ideal conditions, the battery should have sufficient capacity to start the engine under extreme low temperature conditions and to serve purely as a stand-by unit on occasion. Generator regulation will be expected to keep the battery normally charged and ready for instant duty as a starting device.

Headlighting will improve and ultimately we may see headlamps of 100-watt capacity, according to Nela Park, which expects systems of this character in perhaps five years or less.

DIESEL ENGINES—Nothing at the moment indicates more than a healthy growth of the automotive diesel, and this mainly for heavy-duty truck units. Several large parts makers have been working on injection systems for a number of years and may be ready for public announcement sometime soon. With American producers in this field and with greater competition, we may find a stimulus to increased diesel production.

However, to balance this development we find a number of manufacturers ready to enter the lists with oil-burning attachments for standard gasoline engines. Several of these are scientific developments of the early crude attempts at conversion units. The operation of these units is based upon accurate temperature controls; engines start and run on gasoline until the oil unit is ready to switch over—they idle on gas and may run on gas wherever the temperatures are too low. It is even possible to produce this cycle automatically but it has been found inadvisable to do so at the present stage of development.

SUMMARY — The foregoing offers in very generalized form some idea of the probable trend in engineering for 1937. Naturally, there will be novelties in metal tailoring to enhance eye appeal but nothing radical in body forms is anticipated. It is quite likely that the coming models will follow current trends with natural refinements and improvements. The real novelties should be the offerings of the parts and accessory producers in the form of attachments, gadgets, and comfort features most appreciated by the buying public.

Barring sudden shifts, 1937 will be the year of big changes and moves to radical construction, such as rear drive, frameless running gear, new body forms.

The Horizons of Business

By Joseph Stagg Lawrence

Receding Waters

THE floods of the past two weeks have left in their wake broken bridges, damaged homes, severed arteries of communication — and also some plausible fallacies regarding the effects. There are two broad views expounding the putative economic consequences of the flood. The first is the immediate impression that the nation has suffered a grave loss which may check the course of business progress. This view has much to commend it and is open to criticism only insofar as it tends to exaggerate. The other view regards the flood as an ideal bed of ashes from which the phoenix of greater prosperity may emerge. We apologize for the figure of speech. The fact is that many commentators noting the ravages of the truant waters have calculated the volume of replacement and entered it as an additional stimulus to business.

Business Stimulant?

That a regional catastrophe can be transmuted into a constructive business force does not make sense. In the first place the losses have not been covered by insurance. This means that the individual and corporate victims must charge them to their own resources. In many cases these losses completely destroyed equities and left the victim a bankrupt.

This is serious for two reasons. Here is a small independent baker in Hartford whose equipment has been rendered unfit for use. His inventory has become valueless. For the time being the wicked waters have deprived him of a job and seriously hampered his ability to carry on. The mere fact that his plant now requires repairing, his machinery servicing and partial replacement, and his store's restocking does not qualify as an effective demand for goods. He needs all these things. There can be no dispute about that. Unfortunately transactions cannot be consummated by the intensity with which one of the parties wishes to buy or sell. Such desire must be coupled in one case with the means of purchase and in the other with the supply of goods.

Elementary Economics

This may sound elementary, and for good reason. It is elementary. The Hartford baker whose shop has been gutted is, in a business way, *hors de combat*. With his assets destroyed he has become a poorer credit risk and his IOU's, if accepted at all, will be taken reluctantly and at higher rates. The baker's case may be multiplied thousands of times in various parts of the east. His plight cannot possibly be a salutary stimulant to business. Those who so interpret it assume that the victim, irrespective of any loss, possesses the resources and credit which will permit a speedy restoration of his plant. Only on such assumption is it possible to conclude that the receding waters will leave a crop of construction and capital goods demand.

There have been periods in the past during which large portions of the public believed that the best way to make work was to destroy property. This has no reference to the cotton plowed under or the little pigs which the AAA sent to an untimely death. A stone tossed through a window pane was once considered a salutary stimulant to business by an early French economic cult. On such a premise any steps taken to prevent a recurrence of the recent floods would in effect sabotage business progress. This theory of business encouragement is close kin to some of the ideas which the American public has been asked to accept during the past three years. In the case of the floods work has been made by an Act of God. The same effect can be accomplished by man.

The Meaning of Wealth

To get this straight, consider the nature of wealth. There are two ways in which wealth is produced. We had luncheon the other day with a Guernsey enthusiast named Brown. He was elated with the continuing results of a deal. It seems that he had purchased a very fine Guernsey cow for an absurdly low figure. The bidders in the sale ring knew that the cow was well along in years, and suspected that the owner was offering her because she had some serious defect which did not meet the eye. Our friend bought the cow for $700. Within 60 days she freshened and threw a fine bull calf which brought $1,600 when only a month old. The cow is again in calf and going strong. The man reckons that he has already made a profit of $1,600.

This sum is a claim against wealth. For practical purposes it is wealth. The real estate operator who turns a profit, the stock speculator who guesses right, the successful sweepstake ticket holder, all obtain wealth through plain good luck, a keen sense of values or sharp wit. It is not possible for every one to accumulate wealth in this fashion, since we would speedily starve to death. The other method of creating wealth is to raise the cow, make loaves of bread and build. The orthodox economist would define such products as real wealth. The speculator and the dealer secure claims to wealth. These claims the economist calls capital. The tangible substance of capital is wealth, and wealth can only be created by physical toil aided by machinery and power. Wealth may be regarded as the crystallized fruit of labor, the material embodiment of effort.

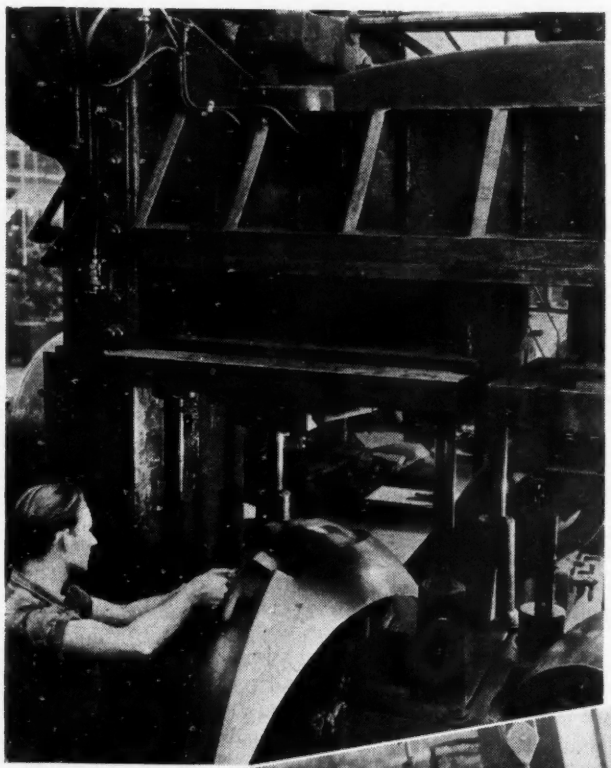
Man-Made Dangers

If restrictions are imposed upon labor which makes it less effective it follows that the wealth created, whether for immediate consumption or deferred use, declines. Conditions which discourage productive effort have precisely the same effect upon the material income of the community and upon the substance accumulated for the future as a raging flood which destroys the workshop of the tailor and the plant of the baker. Such restrictions may operate upon the worker, diminishing his output and reducing his value to him-

(Turn to page 485, please)

Lincoln-Zephyr

brings forth the first fundamental changes in assembly line practice for several years



Two - station punch press setup for front fender lamp mounting opening.

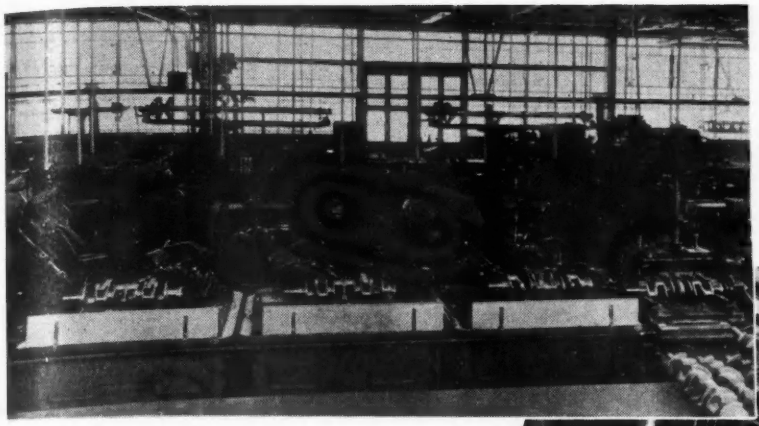
TO evolve a revolutionary or even a marked change in manufacturing technique these days is a feat of no mean proportions. Yet the introduction of the Lincoln-Zephyr actually brought about the first fundamental change in passenger car assembly practice in many years.

Since enough has been published by now to acquaint everyone with the construction of the Lincoln-Zephyr, it is of interest to see how this has affected the character of the assembly lines. If you walk through the plant, keeping a mental picture of orthodox practice, you will be impressed immediately with the simplicity of the layout. No more frame assembly—no more chassis assembly—and an entirely different kind of final assembly. In fact there is only one assembly line as we know it ordinarily, and most of the running gear installation is made with the body suspended from an overhead monorail rather than on a floor conveyor.

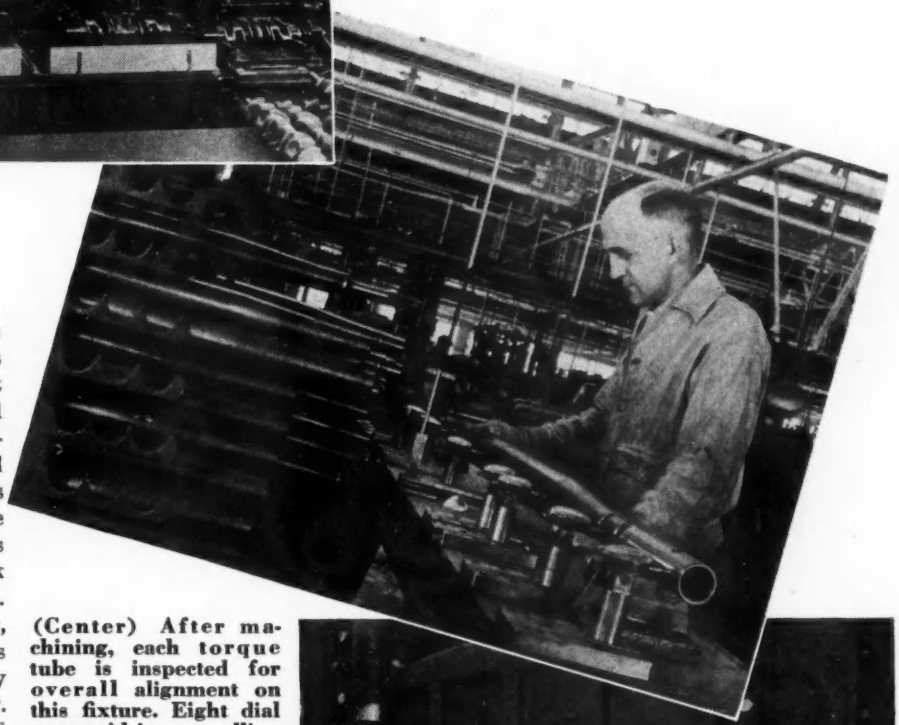
Lincoln-Zephyr bodies, with their in-

(Above) Final station of front unit assembly showing adjustment for front wheel alignment. The spring is deflected and entire unit held in normal running position for adjustment

(Right) Finished torque tube is mounted in lathe and turned at speed corresponding to 95 miles per hour road speed to test for "whip." Maximum permissible deflection is 0.030 in.



(Left) Battery of four special unit-type drilling machines for crankshaft oil lines. The two machines at the left have a combination of inclined vertical and horizontal drilling heads; the third machine has two horizontal heads; the machine at the extreme right is a heavy-duty single spindle head provided with a multiple spindle drilling attachment fitted with six sets of drills, twelve in all.



(Center) After machining, each torque tube is inspected for overall alignment on this fixture. Eight dial gages aid in controlling alignment and balance.

One of the front fender drawing operations with ram up to show details of die.

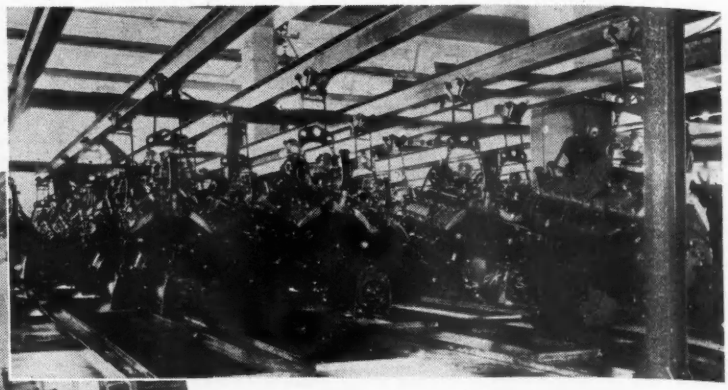
tegrally welded framing which serves the dual purpose of body sill and chassis side rails, are received at the plant ready for paint shop operations and assembly of running gear. The receiving bay is really the scene of initial subassembly operations. With bodies mounted on rails high off the floor, the assembly crew attaches such units as the muffler, tail pipe, gas tank, shock absorbers, pedals and pedal shafts. This takes place on the second floor, and from that point on the body travels on an overhead monorail, suspended by rubber-encased chains from each corner.

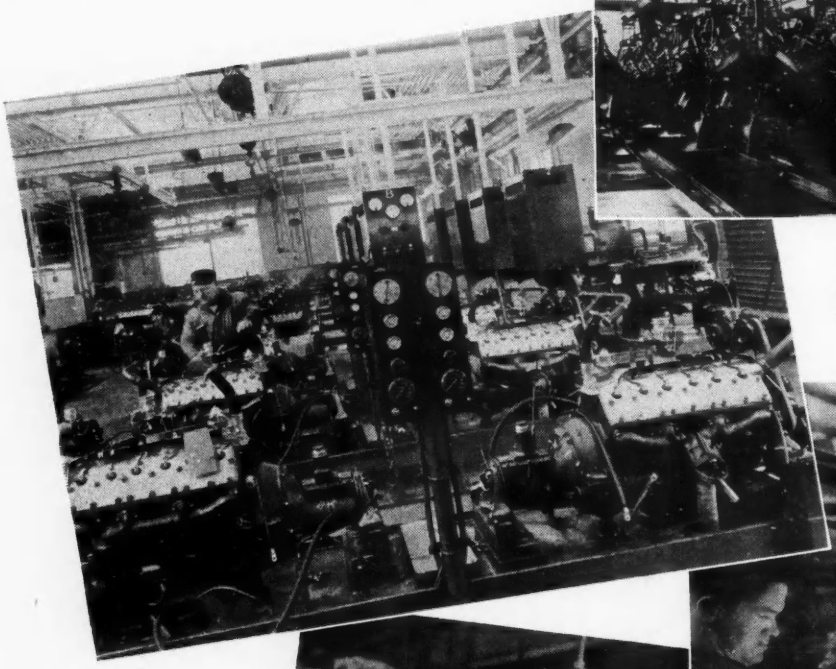
Bodies and sheet metal parts are all finished in lacquer in the new paint shop which was equipped at a cost of about $250,000. Several features of this department are worthy of special mention. First is the installation of modern spray booths provided with conditioned atmosphere, contributing immeasurably to worker comfort. The other feature, surely of great interest to body plant executives, is the use of parallel conveyor chains through the entire department—one for the bodies with hoods and grilles, the other for corresponding sheet metal such as fenders, splashers, etc. Thus the jobs are scheduled in complete sets moving simultaneously and with assurance that the color match for each set will be beyond question, since all sheet metal is sprayed from the same nozzle and at the same time.

Trim shop operations have been subdivided into 28 stations, so that there are always 28 bodies in process with an average of three men per station, although the total number of men in this department exceeds the average due to special steps at various points. Numerous parts, which ordinarily are assembled to the chassis, are assembled into the body here.

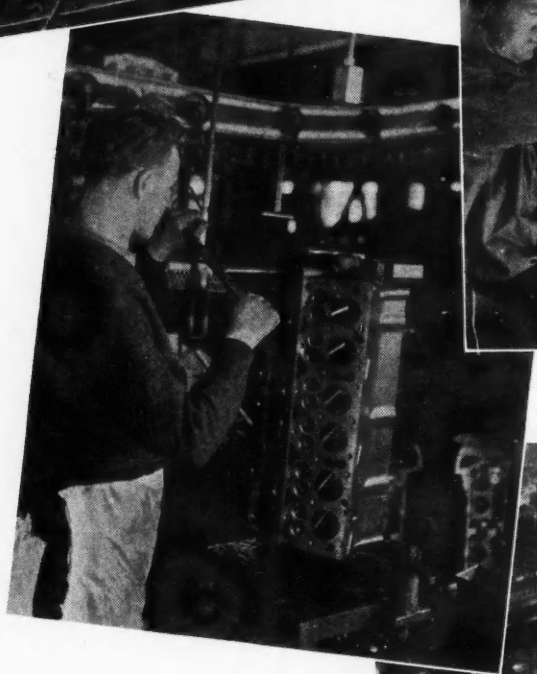
Having passed the gantlet of the paint shop and trim shop, the bodies are ready for the plunge to the first floor for the final assembly. Remember that all this time the bodies have continued on the overhead line, suspended by chains, dipping and rising at various stations in accordance with the level required for a particular operation. For example, at the water deck, the workmen stand on a platform that brings them quite level with the body floor, thus enabling them to reach the roof without much effort.

(Right) Bank of tested powerplants is stored by suspending off rails. When required for the assembly line, the engines are rolled down to the end of the rail and picked up by an electric hoist.



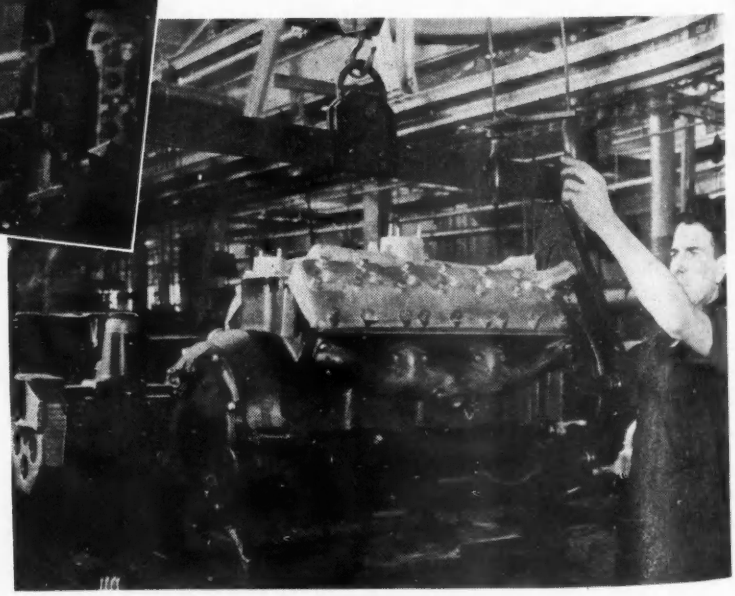


(Below) Fixture used to roll engine over ready for crankcase installation.

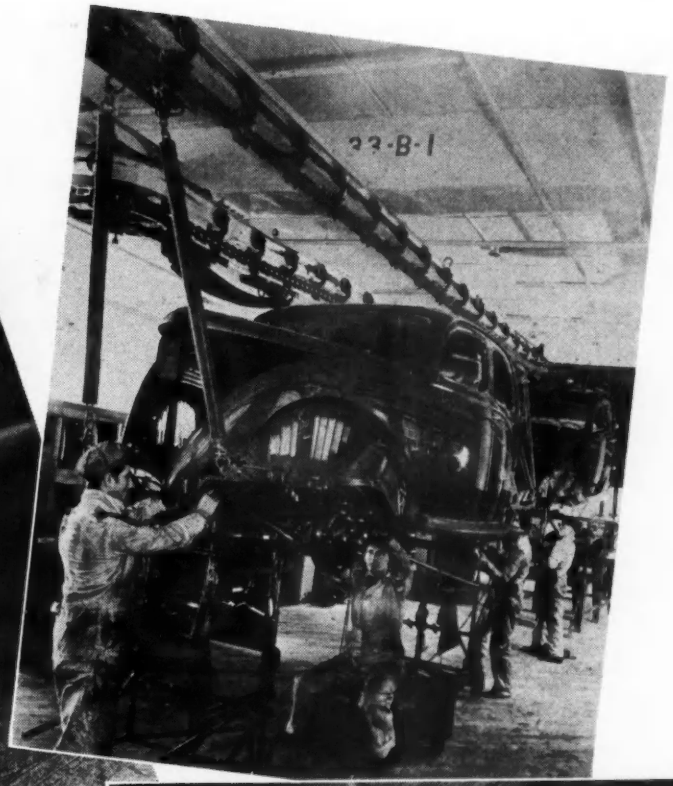


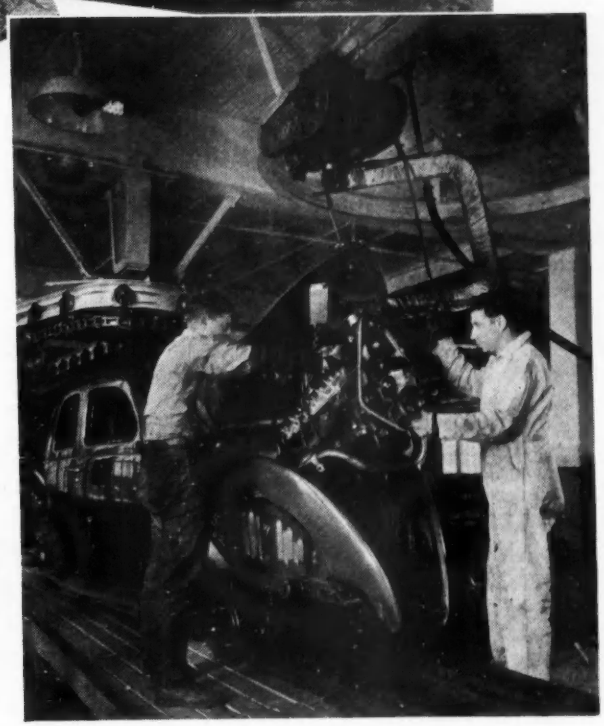
(Upper left) Each powerplant is run in under its own power.

(Lower left) In early stage of engine assembly, the cylinder block is mounted in vertical position to facilitate assembly and fitting of pistons and top bearing caps.



Fixture used to roll over the completed powerplant and transport to run-in department.





(Above) Scene in body receiving bay where incoming bodies are fitted with muffler, tail pipe, gas line, gas tank, etc. Bodies are stored on racks and then fitted with the chains at each corner for transporting through the plant.

(Upper right) Bodies just coming down from the trim shop on the second floor. Here is the group of operators working on the underbody assembly while the body is suspended from the monorail. Note the adjustable jacks used to facilitate the fitting of front and rear end unit assemblies.

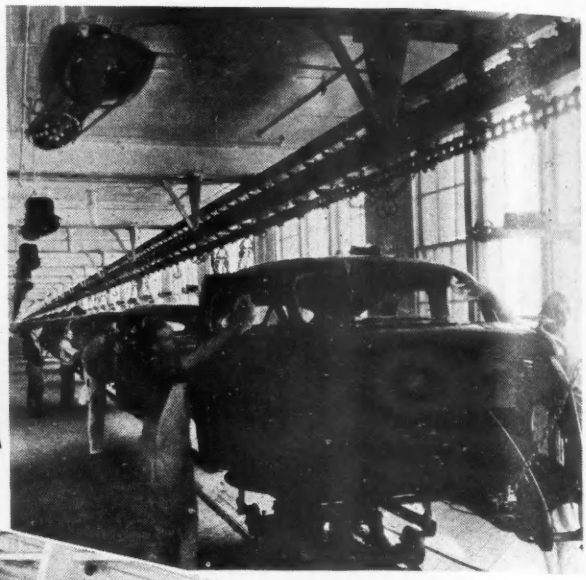
Here is the special balanced cradle used for engine installation. Powerplants are transported by the electric hoist from the engine bank.

As the body reaches the end of the trim line, it dips to the first floor through an opening in the ceiling, and things begin to happen. At this point the body is carried high off the floor and the first assembly station gets to work before the body has completely straightened out with respect to the ceiling (see the illustration). It may be well at this point to mention that final assembly is facilitated by the characteristic running gear units pioneered by Ford, the front end consisting of axle, transverse spring, and radius rods, while the rear end consists of axle, transverse spring, radius rods, and torque tube. These units are built up in another department and sorted in banks at the point of assembly.

Now to go back to the initial assembly stations. As you will note in the pictorial section, the front and rear assemblies are wheeled in on individual elevating-jack platforms, by means of which they are jockeyed into correct alignment and securely attached. This underbody work is performed by the operators while in a rather comfortable position seated on a rolling carriage which is provided with bins for the small fastenings.

Just beyond this station, the monorail dips downward and sets the body and axle assembly on the floor conveyor. If you consult the pictorial section again you will see the ingenious balanced electric hoist carriage used to set the powerplants in place. Incidentally, this station is fed from a bank of powerplants stored in tiers and carried to the line by means of the electric hoist moving on an overhead trolley line.

Engine assembly has some unique features. It is handled in three positions to facilitate the work—straight up-and-down for piston and upper



(Upper left) Note parallel lines of bodies and sheet metal traveling in sets through the paint shop. This view is taken at the water deck.

Final touch-up and polish in paint shop.

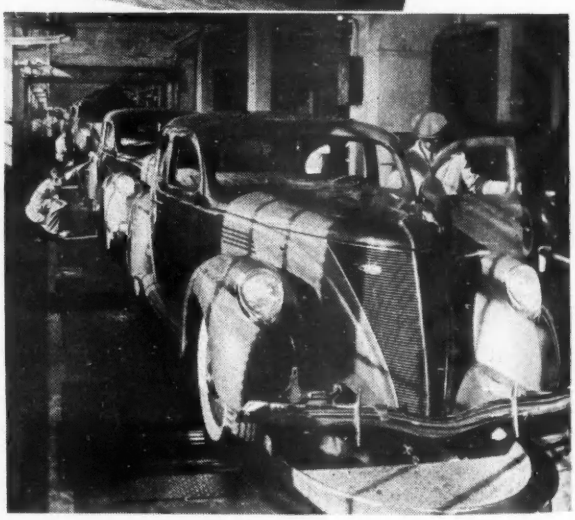
bearings, top down for crankshaft installation, and in normal position for final touches and attachment of clutch and transmission. Several examples of the fixtures used for handling the powerplant and reversing its position on the line are found in the pictorial section. All engines are block-tested before being passed to the assembly line.

As mentioned earlier, the front and rear axle units are completely assembled on short individual lines and given final adjustment so that they may be attached to the body without further attention. Torque tubes for the rear end assembly are subjected to painstaking detail. For example, the tubes are straightened before machining and then are machined accurately to assure precise alignment and balance. After machining, each tube is checked for alignment in a fixture fitted with eight dial gages giving readings at critical points.

Each propeller tube is subjected to a test for "whipping" by rotating in a lathe at a speed corresponding to 95 miles per hour road speed. Maximum permissible deflection is 0.030 in.

In addition to complete machine shop facilities for producing engine and chassis parts in the Lincoln plant, there is a press shop provided with equipment and tooling for the stamping of fenders and other sheet metal parts.

(Center) Finishing touches and final inspection after road testing.

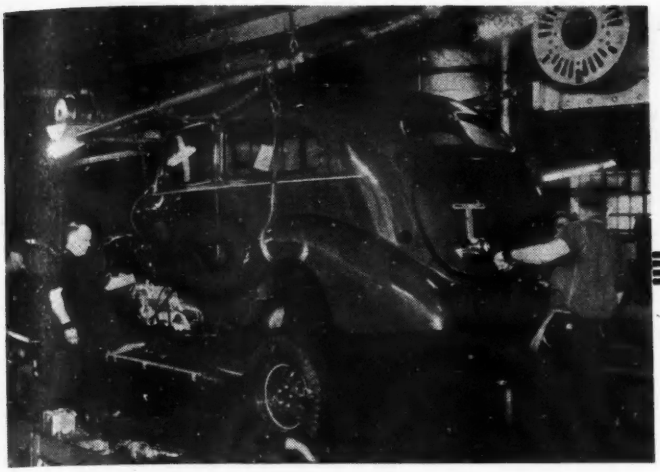


(Right) Last step on final assembly line is the pit-station. Here the operators give it the final touches on underbody fastenings and complete lubrication. In addition, this station is provided with power rollers and individual dial gages for precise brake adjustment.

The front fender is a particularly intricate stamping requiring a good deal of hand finish in addition to a separate press operation for punching the opening for the fender lamps.

For the final steps in the building of the Lincoln-Zephyr, you will note that the very last station on the assembly line is a pit-station which takes care of all chassis lubrication as well as brake adjustment. The cars are then driven off the line and taken out for a routine road test. Each car gets a first and second test on the track with adjusting operations between. Then they come back, they are routed to the final inspection depot for the finishing touches, making the cars ready for shipment.

This brief excursion through the Lincoln-Zephyr plant will serve as a reasonable perspective of an entirely new idea in motor car manufacture. However, it will take a personal visit on your part to appreciate the time and labor and infinite detail evident in every department which set this car in a class all its own.—J. G.



PRODUCTION LINES

Every two minutes a body drops into place on the chassis in the Hudson-Terraplane assembly line

With Automatics

Remarkable progress has been made with automatic screw machines during the past year. Take for example the recent installations in one of the big automobile plants in the Detroit area. There is a B&S automatic turning out a hex head-screw in which the head takes four drilled holes for a sealing wire. The drilling is done automatically with a special attachment. A set of fingers pick the screw out of the chuck and set it into the drilling attachment where the screw is indexed and drilled in time with the rest of the cycle. Then there is a National Acme machine that finished a ball-head stud. Heretofore it was necessary to form and thread in the screw machine, then transfer the work to a grinder to produce a flat on the end of the ball, then again to a small miller to cut a slot in the threaded end. Now everything is done in the same setting with a cycle that completes a piece in six seconds. To cut the slot, a small circular saw is rotated at the speed of the work so that the relative movement between work and tool is zero. Here, indeed, is remarkable progress.

Rust Proofed

"Rust Proofing by the Cromodine Process" is a new bulletin just off the press and ready for distribution to readers of this page. Metallurgists, paint shop executives and production men in general will be interested. It describes the Cromodine process, what it is and how it's done; and it covers the details of typical installations recently made in automotive plants. An interesting group of test panels shows the results of comparative accelerated corrosion tests. Cromodine can be applied on a variety of metal surfaces including sheet steel, cast iron, malleable iron, and forged steel products.

Truss Tube

One of our friends tells us that he has developed the Payne inner tube which makes possible the use of a simpler form of tire casing. It is claimed that many people have attempted to build a tire carcass in which the cords are laid radially instead of circumferentially. Heretofore this construction has been impractical for the reason that the carcass lost all lateral rigidity and steering control was out of the question. The Payne tube, as we understand it, has a series of crossed ribs molded inside of the tube completely around the periphery. Its inventor claims that this gives the needed rigidity at any road speed.

Going Up

One of the best signposts of good business is the general trend in modernization and more particularly in the building of new plants or plant extensions. On our recent visit to Cleveland area we found a number of examples of new building programs, indicating the need for more productive floor space.

19,000 Washers

A manual listing over 19,000 die sets for almost every conceivable type of special washer and hundreds of special stampings has been issued by the Wrought Washer Mfg. Co. It looks like a natural for designers, purchasing agents, and production men since it offers a ready source for tools and dies for almost any program. There would seem to be considerable economy in charting your new design according to the tools listed in this manual and it would even pay to make a little compromise in your design to accommodate the standard tools. If this is done, you can specify a stock set of tooling and get a rather decent price on it. You'll want this handbook for your desk. And we will be glad to get you a copy.

Color Plating

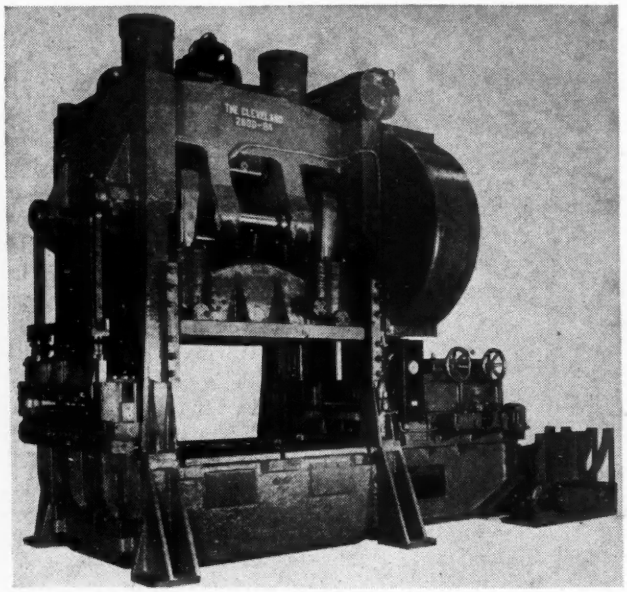
To the wide variety of color finishes for interior hardware, now available, you can add one that's not yet ready for complete discussion—a plated color finish in almost any hue and shade imaginable. The important finishes of deluxe type now available include—alumiliting for aluminum die castings, Macoid cellulose-nitrate coating for any base of any material, a die cast color finish, and now the plated color finish.

Explains Diesel

One of the first of a new series of booklets on technical subjects explained for the layman has been issued by General Motors. This one is entitled, "Diesel, the Modern Power" and comes from the Technical Data Dept. of GMR. It is devoted largely to an explanation of the Winton diesel and gives some interesting illustrations. Among these are a schematic drawing of the injector; and a good view of one of the big new planers set up to develop the surface of the three-vane aluminum alloy blower rotor.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools



Cleveland 4-Point Suspension Press

New Products by U.S. Tool Co.

A new milling machine which serves either as a high speed semi-automatic miller or a regulation hand miller has been developed by the U. S. Tool Co., Inc., Ampere, N. J. This dual purpose makes it useful in plans having both large production runs and numerous hand milling operations. The power table feed is cam operated which is said to make it possible to obtain any desired table speed or combination of speeds.

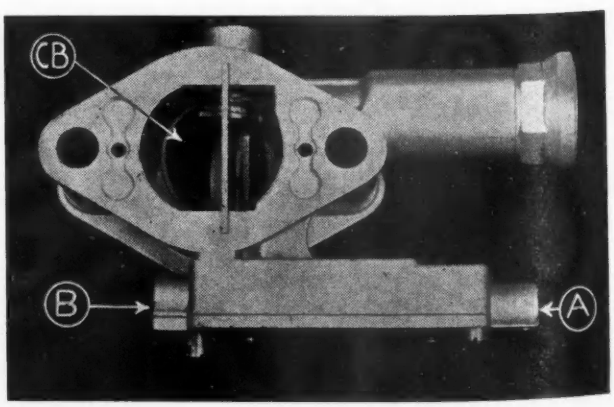
Another new product is the automatic stock reel illustrated, which is motor driven and employs a simple mechanism which automatically maintains a loop of stock. This reel is made in vertical and horizontal types, and in different sizes and capacities.

U. S. Tool Co. Reel

Four-Point Blade on Leibing Governor

One of the most important requirements of a velocity type governor is that it must not limit full engine performance. This requirement is said to be met in the design of the Leibing governor, by the use of a "four-point" blade which gives a very rapid rate of closure and reopening and does not curtail the power below the governed speed. It is claimed that this throttling valve, in operating from the fully open to the fully closed position, develops an increasing torque in exact proportion to the controlling spring, so that it is in a balanced condition at all times. To eliminate drag a ball bearing mounting is used for the blade.

This governor, which is manufactured by Leibing Automotive Devices, Inc. Detroit, Mich., is provided with an adjustment that can be completely sealed after proper setting.



Leibing governor for cars, trucks and buses

Cleveland Press Has Own Air Supply

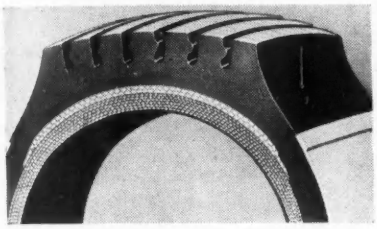
The Cleveland four-point suspension press, used for blanking and forming, is equipped with an electrically controlled, air operated friction clutch and brake, as well as self-contained pneumatic draw cushions in the bed. The slide is also air counterbalanced. To make the operation of the press entirely independent of the plant air supply a compressor is mounted on top of the machine.

Instead of the usual single shaft with but two connections, this line of presses is designed with two shafts having two connections on each shaft. This arrangement is claimed to maintain perfect alignment between the slide and the bed, whether the work is in the center or off center.

A feature of this press, built by the Cleveland Punch and Shear Works Co., Cleveland, Ohio, is the arrangement of the double roll feed which is synchronized through an interlocking system so that if the predetermined amount of material is not fed into the press the ram will stop instantly.

Safety Tread Developed for U. S. Tire

U. S. Rubber Products, Inc., New York City announces a new tire, the U. S. Royal Master with ribbed tread. U. S. engineers claim that on a slippery pavement a tire rides on a thin film of water that acts as a lubricant, and that skidding can only be prevented by squeezing out this film and allowing the tire to come into actual contact with the road surface. Tests were made with different treads and the final one adopted was the seven rib design illustrated. It is claimed that a car equipped with this tire can safely take curves at high speed without side-slipping, and will not swerve



on sudden application of the brakes.

To increase traction and prevent forward skidding, the tread is also divided, at right angles to the ribbing, into hundreds of sharp-edged blocks which are said to grip the road surface with a centipede-like grip. This construction is also claimed to make the tread more flexible and permits it to conform to road irregularities.

To prevent the tire from picking up and retaining stones on gravel roads, a special shape groove has been developed as shown. This construction also prevents the grooves from closing. The new tire is reported to be very quiet.

The Horizons of Business

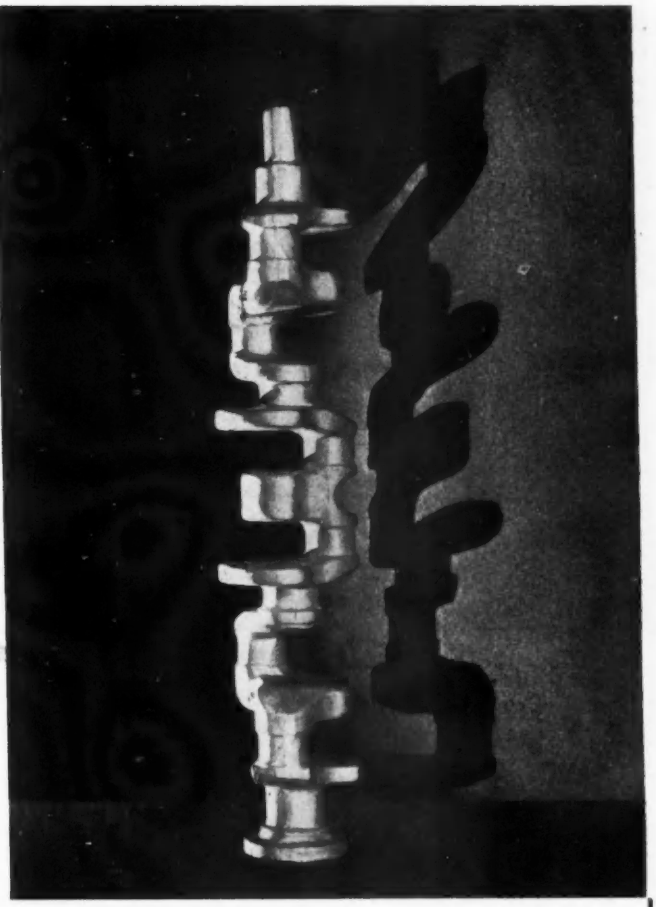
(*Continued from page 477*)

self and the community. It may operate upon the responsible management which assumes the risks of production. When a labor leader sounds the strike call and projects thousands of workers into voluntary unemployment the process of wealth production is suspended. It may be as sensational an armistice upon wealth production as that imposed by the errant Monongahela or the fractious Housatonic. The effect of the two is not essentially dissimilar.

The Townsend movement, social credit, the glittering sophistries summoned to the support of the bonus, the 30-hour week and relief, all abound in solicitous references to the consumer. The consumer has no standing unless a producer first provides subsistence. Wealth flows not from consumption but from production.

This brings us to the more rational though possibly exaggerated view that the floods have given business a serious setback. The view is entirely valid insofar as the waters have impaired productive capacity. If the victims are helped to go to work, if plants and equipment are restored, business should again be able to resume where melting snows and Jupiter Pluvius forced it to take time out. There is no fundamental reason why these disasters, truly minor on the vast scale of national volume, should disturb the trend of recovery.

Paragraph 37 of Decree No. 17 of the French Department of Public Works says that article 320 of the Code of Indirect Taxes is abrogated, which implies that after that date all motor vehicles in France, whether running on gasoline, heavy oil, producer gas, steam or electricity, no longer need to pay the annual traffic tax.

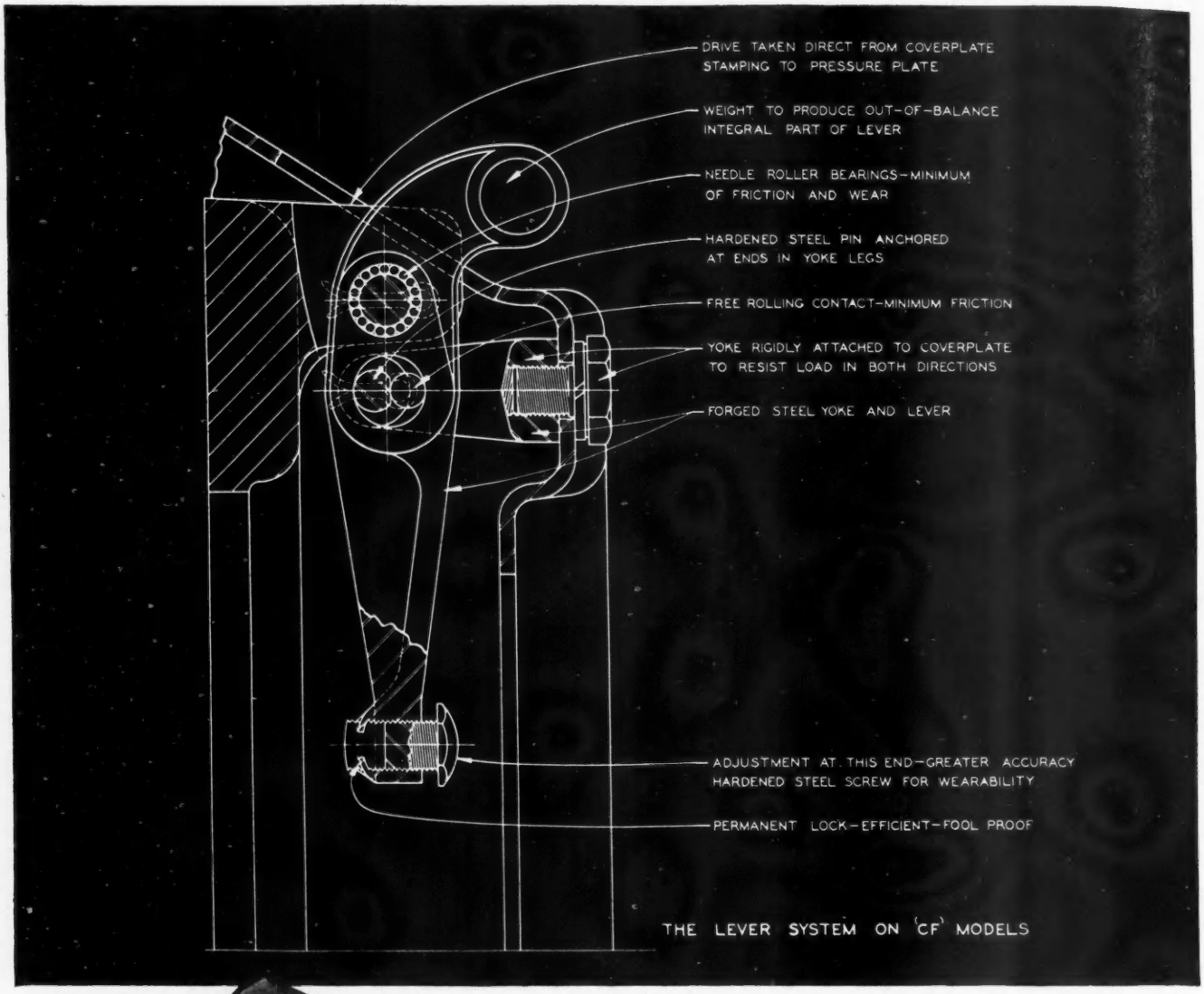


Forgings with a background—

Behind every Wyman-Gordon forging stands diligent scientific examination of every bar of steel—continuous laboratory control of all processes.

WYMAN-GORDON

Worcester, Massachusetts Harvey, Illinois


DRIVE TAKEN DIRECT FROM COVERPLATE STAMPING TO PRESSURE PLATE
WEIGHT TO PRODUCE OUT-OF-BALANCE INTEGRAL PART OF LEVER
NEEDLE ROLLER BEARINGS—MINIMUM OF FRICTION AND WEAR
HARDENED STEEL PIN ANCHORED AT ENDS IN YOKE LEGS
FREE ROLLING CONTACT—MINIMUM FRICTION
YOKE RIGIDLY ATTACHED TO COVERPLATE TO RESIST LOAD IN BOTH DIRECTIONS
FORGED STEEL YOKE AND LEVER
ADJUSTMENT AT THIS END—GREATER ACCURACY HARDENED STEEL SCREW FOR WEARABILITY
PERMANENT LOCK—EFFICIENT—FOOL PROOF
THE LEVER SYSTEM ON 'CF' MODELS

Each of the three release levers of the new Long clutch is integrally weighted to be out of centrifugal balance. This gives the desirable low-pressure pedal at idling speeds, with substantially increased pressure at driving speeds . . . it is a patented feature of the Long semi-centrifugal clutch.

LONG

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